

PUBLICATIONS
of the
NATIONAL BUREAU OF STANDARDS
1901 to June 30, 1947



CIRCULAR 460

U. S. DEPARTMENT OF COMMERCE

CHARLES SAWYER, Secretary



NATIONAL BUREAU OF STANDARDS

E. U. CONDON, Director

PUBLICATIONS
of the
NATIONAL BUREAU OF STANDARDS

1901 to June 30, 1947

NATIONAL BUREAU OF STANDARDS CIRCULAR 460

Issued August 16, 1948

FOREWORD

The National Bureau of Standards is the principal agency of the Federal Government for fundamental research in physics, chemistry, and engineering. Its activities include research in electricity, electronics, atomic physics, applied mathematics, mechanics and sound, radio and radio propagation, optics, heat and power, metallurgy, metrology, ordnance, physical chemistry, mineral products, organic and fibrous materials, and building technology.

The Bureau also has custody of the national standards of physical measurement, in terms of which all working standards in research laboratories and industry are calibrated, and conducts research leading to the improvement of these standards, the techniques of measurement, and improved instrumentation. Improved methods of testing materials and equipment are developed, physical constants and properties of materials are determined, and technical processes are investigated.

The results of the Bureau's research, development, and test activities are reported in two types of publications: periodical and nonperiodical. There are three periodicals: the Journal of Research of the National Bureau of Standards, the Technical News Bulletin, and Basic Radio Propagation Predictions.

Mathematical tables, studies and tests of construction materials, safety codes, weights and measures recommendations and information, commodity standards, and miscellaneous compilations of data are reported in the following nonperiodical series: Mathematical Tables, Building Materials and Structures Reports, Circulars, Handbooks, Commercial Standards, Simplified Practice Recommendations, and Miscellaneous Publications.

This Circular presents a complete list of Bureau publications, with brief abstracts for those issued during the period January 1, 1942 to June 30, 1947. Circular C24 and Supplements, listing abstracts of all publications from 1901 to December 31, 1941, are available for those desiring this more complete reference.

E. U. CONDON, *Director.*

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CONTENTS

	Page
Foreword	II
1. General information	2
Purchase procedures	2
Announcements of Bureau publications	2
Catalogs of publications	3
Mailing lists	3
Depository libraries	3
Bound volumes	10
2. Periodicals of the Bureau	15
Journal of Research of the National Bureau of Standards	15
National Bureau of Standards Technical News Bulletin	16
Basic Radio Propagation Predictions	16
3. Titles and abstracts of publications	16
Scientific Papers	18
Technologic Papers	33
Research Papers	43
Circulars	168
Handbooks	183
Miscellaneous Publications	185
Simplified Practice Recommendations	193
Commercial Standards	198
Building Materials and Structures Reports	207
Building and Housing Publications	218
Mathematical Tables	219
4. Author index	222
5. Subject index	310

1. GENERAL INFORMATION

PURCHASE PROCEDURES

The publications of the Bureau are distributed principally by the Superintendent of Documents, United States Government Printing Office, Washington 25, D. C., who sells them, as long as copies are available, at the prices given in this Circular. Where prices are omitted, the publications are out of print, but may be consulted in reference libraries maintaining sets of Bureau papers.

How to make remittances. Remittances for publications for which individual sales or subscription prices are shown should be mailed to:

Superintendent of Documents,
U. S. Government Printing Office,
Washington 25, D. C.

The rules of the Superintendent of Documents require that remittances be made in advance, either by coupons sold in sets of 20 for \$1 and good until used, or by check or money order payable to the Superintendent of Documents. Currency, if used, is at sender's risk. Postage stamps, foreign money, and defaced or smooth coins are not acceptable. Postage is not required in the United States, to United States possessions, and to countries extending franking privileges. For mailing to other countries, an additional amount of about one-third of the purchase price is required. Remittances from foreign countries should be by international money order payable to the Superintendent of Documents, or by draft on an American bank. The letter symbol with each publication number and the full title of the publication must be given when ordering. If 100 copies or more of any publication are ordered, a discount of 25 percent is allowed.

ANNOUNCEMENTS OF BUREAU PUBLICATIONS

There are several official sources of information as to new publications of the National Bureau of Standards. The following announcements are issued regularly by governmental agencies. In addition, many of the technical journals carry notices of new Bureau publications of interest in their respective fields.

Technical News Bulletin. Issued monthly by the National Bureau of Standards. Announces all new publications by members of the staff, including those appearing in outside journals. Available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Annual subscription, \$1; \$1.35 foreign. Single copies, 10c each.

Monthly Catalog of United States Government Publications. Issued monthly by the Superintendent of Documents, United States Government Printing Office, Washington 25, D. C. Annual subscription, with consolidated annual index, \$3.00; \$3.75 foreign.

Price Lists. Publication lists prepared by the Superintendent of Documents on special subjects. These will be furnished free, on application, if the subject concerning which information is desired is stated.

List of Selected Government Publications. Issued semimonthly by the Superintendent of Documents. Each list is arranged alphabetically.

cally by subjects, with annotations and prices. May be obtained free from that office.

Building Materials and Structures Reports. The Superintendent of Documents maintains a free mailing list of addresses to receive notices of new reports in this series. An alternative method is to deposit with the Superintendent of Documents the sum of \$5, with the request that these reports be mailed to you as issued.

Business Service Check List. Weekly announcement of publications of the Department of Commerce. Lists titles and prices of National Bureau of Standards publications, as well as those of other offices of the Department of Commerce. Available from the Superintendent of Documents for \$1.00 a year domestic; \$1.75 foreign.

CATALOGS OF BUREAU PUBLICATIONS

Previous catalogs and this Circular give a complete list of the titles and brief abstracts of the Bureau's publications up to June 30, 1947. These lists are available from the Superintendent of Documents, United States Government Printing Office, Washington 25, D. C., at the prices given below, or they may be available for consultation in libraries maintaining sets of Bureau Circulars.

	<i>Cents</i>
Circular C24, 7th edition: Publications of the Bureau of Standards 1901 to 1925. 271 pages, including brief abstracts and subject index.....	45
Circular C24 Supplement: Supplementary list of publications of the Bureau of Standards, July 1, 1925, to December 31, 1931. 214 pages, including brief abstracts and subject index.....	25
Circular 24 Supplement: Supplementary list of publications of the National Bureau of Standards, January 1, 1932, to December 31, 1941. 386 pages, including brief abstracts. The subject and author indexes cover the period 1901 to December 31, 1941.....	50
Circular 460: Publications of the National Bureau of Standards 1901 to June 30, 1947. 375 pages, including subject and author indexes, and brief abstracts for the period from January 1, 1942 to June 30, 1947.....	75

MAILING LISTS

Names of individuals are not placed on the Bureau's mailing lists. The principal distribution is by the Superintendent of Documents on a sales basis. A limited edition of each paper is printed for Bureau administrative needs and for official distribution to cooperating laboratories, technical organizations, Government agencies, and to leading public and educational institutions libraries. In addition, the Superintendent of Documents distributes copies of selected Bureau publications to the Government depository libraries listed below.

DEPOSITORY LIBRARIES

The Superintendent of Documents, United States Government Printing Office, is authorized by law to furnish Government publications to designated depository libraries. The libraries listed below are now receiving certain selected publication series of the National Bureau of Standards for general reference use. Whether or not a given library has a copy of any particular publication can only be determined by inquiry at the library.

State or territory	City	Name of library
Alabama.....	Auburn.....	Alabama Polytechnic Institute.
	Birmingham.....	Birmingham Southern College, M. Paul Phillips Library
		Howard College.
		Public.
	Clayton.....	Barbour County Library.
	Florence.....	State Teachers College.
	Jacksonville.....	State Teachers College.
	Montgomery.....	State Capitol, Department of Archives and History.
		State and Supreme Court.
	Spring Hill.....	Spring Hill College, Thomas Byrne Memorial Library.
Alaska.....	Tuskegee.....	Tuskegee Institute, Hollis Burke Frissell Library.
	University.....	University of Alabama.
Arizona.....	College.....	University of Alaska.
	Juneau.....	Territorial Historical Library and Museum.
	Flagstaff.....	Arizona State Teachers College.
	Phoenix.....	Department of Library and Archives.
		Phoenix Public.
	Tempe.....	Arizona State Teachers College, Matthews Library.
Arkansas.....	Thatcher.....	Gila Junior College Library.
	Tucson.....	University of Arizona.
	Clarksville.....	College of the Ozarks.
	Conway.....	Hendrix College Library.
	Fayetteville.....	University of Arkansas.
California.....	Hardy.....	Sharp County Public.
	Jonesboro.....	Arkansas State College.
	Russellville.....	Arkansas Polytechnic College.
	Alturas.....	Modoc County Public.
	Bakersfield.....	Kern County Free.
	Berkeley.....	University of California.
	Claremont.....	Pomona College.
	Eureka.....	Eureka Free.
	Fresno.....	Fresno County Free.
	Long Beach.....	Public.
	Los Angeles.....	Los Angeles Public.
		Loyola University.
		Occidental College.
		University of California at Los Angeles.
		University of Southern California.
	Oakland.....	Oakland Public.
	Pasadena.....	California Institute of Technology.
	Redlands.....	University of Redlands.
	Richmond.....	Richmond Public.
	Sacramento.....	California State.
		City Free.
	San Diego.....	San Diego Public.
	San Francisco.....	Mechanics Mercantile.
		San Francisco Public.
	Santa Barbara.....	Santa Barbara Public.
	Santa Rosa.....	Free Public.
	Stanford University.....	Stanford University.
	Stockton.....	Stockton Free Public.
	Torrance.....	Torrance Public.
	Boulder.....	University of Colorado.
Colorado.....	Colorado Springs.....	Colorado College, Coburn Library.
	Denver.....	Colorado State.
		Public.
		Regis College.
		University of Denver, Mary Reed Library.
	Fort Collins.....	Colorado State College of Agriculture and Mechanic Arts.
	Golden.....	Colorado School of Mines.
	Gunnison.....	Western State College.
	Pueblo.....	McClelland Public.
	Bridgeport.....	Public.
Connecticut.....	Hartford.....	Connecticut State.
		Public.
		Trinity College.
	Middletown.....	Wesleyan University.
	New Haven.....	Yale University.
	New London.....	Connecticut College, Palmer Library.
		U. S. Coast Guard Academy.
	Storrs.....	University of Connecticut.
	Waterbury.....	Silas Bronson.
	Dover.....	Delaware State.
Delaware.....	Newark.....	University of Delaware.
	Wilmington.....	Wilmington Institute Free.
District of Columbia..	Washington.....	Department of Agriculture.
		Department of Interior, U. S. Geological Survey Library.
		Department of Justice.
		Department of State.
		National War College.
		Navy Department, Naval Records and Library.

State or territory	City	Name of library
District of Columbia (con't).....	Washington (con't)	Post Office Department, Historical Library. Public. Treasury Department. University of Miami, Law Library.
Florida.....	Coral Gables..... De Land..... Fort Lauderdale..... Gainesville..... Jacksonville..... Lakeland..... Tallahassee.....	John B. Stetson University, Sampson Library. Fort Lauderdale Public. University of Florida. Jacksonville Public. Lakeland Public. Florida A. & M. College. Florida State College for Women. Florida State. Rollins College.
Georgia.....	Winter Park..... Athens..... Atlanta..... Augusta..... Collegeboro..... Dahlonega..... Emory University..... Macon..... Savannah..... Honolulu.....	University of Georgia, General Library. Carnegie. Georgia State. Academy and Junior College of Augusta. Georgia Teachers College. North Georgia College. Emory University, Asa Griggs Candler Library. Washington Memorial. Savannah Public. Library of Hawaii. University of Hawaii. Boise Public. Idaho State Law. College of Idaho, Strahorn Memorial Library. University of Idaho. University of Idaho, Southern Branch. Ricks College. Illinois Wesleyan University, Buck Memorial Library. Southern Illinois State Normal University, Wheeler Library. John Crerar. Museum of Science and Industry. Newberry. Chicago Public. University of Chicago. Northwestern University. Freeport Public. Galesburg Public. MacMurray College. Public. Olivet Nazarene College. St. Procopius College. Monmouth College. Illinois State Normal University. Peoria Public. Public. Illinois State, General Library Division. University of Illinois. Wheaton College. Indiana University. Wabash College. Public. Public. Gary Public. De Pauw University. Hanover College. City Free. Indiana State. Indianapolis Public. Purdue University. Public. University of Notre Dame. Morrison-Reeves. Indiana State Teachers College. Valparaiso University. Iowa State College. Erickson Free Public. Iowa State Teachers College. Free Public. Iowa State Traveling. Public. Carnegie Stout Free. Fairfield Free Public. Grinnell College. State University of Iowa. Graceland College. Iowa Wesleyan College, P. E. O. Memorial Library. Cornell College. Public. Baker University. Kansas State Teachers College of Emporia, Kellogg Library.
Hawaii.....		
Idaho.....	Boise..... Caldwell..... Moscow..... Pocatello..... Rexburg..... Bloomington.....	
Illinois.....	Carbondale..... Chicago..... Evanston..... Freeport..... Galesburg..... Jacksonville..... Joliet..... Kankakee..... Lisle..... Monmouth..... Normal..... Peoria..... Rockford..... Springfield..... Urbana..... Wheaton..... Bloomington..... Crawfordsville..... Evansville..... Fort Wayne..... Gary..... Greencastle..... Hanover..... Huntington..... Indianapolis..... La Fayette..... Muncie..... Notre Dame..... Richmond..... Terre Haute..... Valparaiso..... Ames..... Boone..... Cedar Falls..... Council Bluffs..... Des Moines..... Dubuque..... Fairfield..... Grinnell..... Iowa City..... Lamoni..... Mount Pleasant..... Mount Vernon..... Sioux City..... Baldwin City..... Emporia.....	
Indiana.....		
Iowa.....		
Kansas.....		

State or territory	City	Name of library
Kansas (con't).....	Hays.....	Fort Hays Kansas State College, Forsyth Library.
	Hiawatha.....	Morrill Free Public.
	Lawrence.....	University of Kansas.
	Manhattan.....	Kansas State College of Agriculture and Applied Sciences.
	Pittsburg.....	Pittsburg Public.
	Salina.....	Kansas Wesleyan University.
	Topeka.....	Kansas State Historical Society.
	Wichita.....	Kansas State.
	Ashland.....	University of Wichita.
	Bowling Green.....	Ashland Public.
Kentucky.....	Danville.....	Western Kentucky State Teachers College.
	Frankfort.....	Centre College.
	Lexington.....	Department of Library and Archives, Legislative and Law Library.
	Lincoln Ridge.....	University of Kentucky.
	Louisville.....	Lincoln Institute of Kentucky.
	Murray.....	Louisville Free Public.
	Somerset.....	University of Louisville.
	Winchester.....	Murray State Teachers College.
	Baton Rouge.....	Carnegie Public.
	Lafayette.....	Kentucky Wesleyan College.
Louisiana.....	Lake Charles.....	Louisiana State University, Law Library.
	Natchitoches.....	Louisiana State University, Public Documents.
	New Orleans.....	Southwestern Louisiana Institute.
	Ruston.....	John McNeese Junior College.
	Shreveport.....	Louisiana State Normal College.
	Augusta.....	Tulane University, Howard-Tilton Memorial Library.
	Bangor.....	Law Library of Louisiana.
	Brunswick.....	Louisiana State Museum.
	Lewiston.....	Loyola University.
	Orono.....	New Orleans Public.
Maine.....	Portland.....	Louisiana Polytechnic Institute.
	Waterville.....	Shreve Memorial Library.
	Annapolis.....	Maine State.
	Baltimore.....	Bangor Public.
	Chestertown.....	Bowdoin College.
	College Park.....	Bates College.
	Westminster.....	University of Maine.
	Amherst.....	Portland Public.
	Boston.....	Colby College.
	Brookline.....	Maryland State.
Maryland.....	Cambridge.....	U. S. Naval Academy.
	Lynn.....	Enoch Pratt Free.
	New Bedford.....	Johns Hopkins University.
	Salem.....	Morgan State College.
	Tufts College.....	Peabody Institute.
	Wellesley.....	Washington College, George Avery Bunting Library.
	Williamstown.....	University of Maryland.
	Worcester.....	Western Maryland College.
	Ann Arbor.....	Amherst College, Converse Memorial Library.
	Battle Creek.....	Massachusetts State College, Goodell Library.
Massachusetts.....	Benton Harbor.....	Boston Athenaeum.
	Bloomfield Hills.....	Boston Public.
	Detroit.....	State Library of Massachusetts.
	East Lansing.....	Public.
	Grand Rapids.....	Harvard University, Document Division Library, Littauer Center.
	Houghton.....	Massachusetts Institute of Technology.
	Kalamazoo.....	Lynn Public.
	Lansing.....	Public.
	Muskegon.....	Essex Institute.
	Port Huron.....	Tufts College.
Michigan.....	Saginaw.....	Wellesley College.
	Ann Arbor.....	Williams College.
	Battle Creek.....	American Antiquarian Society.
	Benton Harbor.....	Free Public.
	Bloomfield Hills.....	University of Michigan, General Library.
	Detroit.....	Battle Creek Public School.
	East Lansing.....	Benton Harbor Public.
	Grand Rapids.....	Cranbrook Institute of Science Library.
	Houghton.....	Detroit Public.
	Kalamazoo.....	University of Detroit.

State or territory	City	Name of library
Minnesota.....	Duluth.....	Duluth Public.
	Fergus Falls.....	Fergus Falls Public.
	Minneapolis.....	Public. University of Minnesota.
	Northfield.....	Carleton College. St. Olaf College.
	St. Paul.....	Minnesota Historical Society. Minnesota State. St. Paul Public.
Mississippi.....	Saint Peter.....	Gustavus Adolphus College.
	Stillwater.....	Carnegie Public.
	Columbus.....	Mississippi State College for Women, J. C. Fant Memorial Library.
	Hattiesburg.....	Mississippi Southern College.
	Jackson.....	Mississippi State.
Missouri.....	State College.....	Mississippi State College.
	University.....	University of Mississippi.
	Cape Girardeau.....	State Teachers College.
	Columbia.....	University of Missouri.
	Fulton.....	Westminster College.
	Hannibal.....	Free Public.
	Jefferson City.....	Lincoln University.
	Kansas City.....	Missouri Supreme Court. Kansas City Public, Document Department. Rockhurst College.
	Liberty.....	University of Kansas City.
	Rolla.....	William Jewell College. School of Mines and Metallurgy, University of Missouri.
	Springfield.....	Drury College.
	St. Joseph.....	St. Joseph Public.
	St. Louis.....	St. Louis Public. St. Louis University.
	Warrensburg.....	Washington University.
	Bozeman.....	State Teachers College.
Montana.....	Butte.....	Montana State College.
	Helena.....	Montana School of Mines. Helena Public.
	Lewistown.....	Historical Society of Montana.
	Missoula.....	Fergus County High School.
	Blair.....	State University of Montana.
Nebraska.....	Crete.....	Dana College.
	Fremont.....	Doane College, Whitin Library.
	Lincoln.....	Midland College.
	Omaha.....	Nebraska State. University of Nebraska.
	Scottsbluff.....	Municipal University of Omaha Library.
Nevada.....	Carson City.....	Omaha Public. Public.
	Reno.....	Nevada State. University of Nevada.
	Concord.....	Nevada State Historical Society.
	Dover.....	New Hampshire State.
	Durham.....	Dover Public.
New Hampshire.....	Hanover.....	University of New Hampshire, Hamilton Smith Library.
	Laconia.....	Dartmouth College.
	Manchester.....	Laconia Public.
	Atlantic City.....	City Library.
	Bayonne.....	Free Public.
New Jersey.....	Camden.....	Free Public.
	Convent Station.....	Camden Free Public.
	Elizabeth.....	College of St. Elizabeth, Santa Maria Library.
	Jersey City.....	Public.
	Madison.....	Free Public.
	Newark.....	Drew University, Rose Memorial Library.
	New Brunswick.....	Public.
	Princeton.....	Free Public.
	Trenton.....	Rutgers University.
	Albuquerque.....	Princeton University.
New Mexico.....	Las Vegas.....	New Jersey State.
	Santa Fe.....	Free Public.
	Silver City.....	University of New Mexico.
	State College.....	New Mexico Highlands University.
		New Mexico State Law.
New York.....	Albany.....	New Mexico State Teachers College.
	Brooklyn.....	New Mexico College of Agriculture and Mechanical Arts.
	Buffalo.....	New York State.
	Canton.....	Brooklyn College.
	Flushing.....	Pratt Institute. Public. St. Johns University. Grosvenor. Buffalo Public. St. Lawrence University. Queens College.

State or territory	City	Name of library
New York (con't)	Farmingdale, L. I.	State Institute of Applied Agriculture.
	Glens Falls	Crandall.
	Hamilton	Colgate University.
	Ithaca	Cornell University.
		N. Y. State College of Home Economics, Martha Van Rensselaer Hall Library.
	Jamaica	Queens Borough Public.
	Keuka Park	Keuka College Public.
	Newburgh	Newburgh Free.
	New York	College of the City of New York.
		Columbia University.
		Cooper Union.
		Fordham University.
		New York Law Institute.
		New York University.
		New York Public, Astor Branch.
		New York Public, Lenox Branch.
		Clarkson College of Technology.
	Potsdam	Vassar College.
	Poughkeepsie	University of Rochester, Rush Rhees Library.
	Rochester	Union College.
	Schenectady	St. Bonaventure College.
	St. Bonaventure	Syracuse University.
	Syracuse	Troy Public.
	Troy	Utica Public.
	Utica	Yonkers Public.
	Yonkers	U. S. Military Academy.
	West Point	University of North Carolina.
North Carolina	Chapel Hill	Queens College.
	Charlotte	Davidson College.
	Davidson	Duke University.
	Durham	Agricultural and Technical College.
	Greensboro	North Carolina State College, D. H. Hill Library.
	Raleigh	North Carolina State Library.
	Salisbury	Catawba College.
	Wake Forest	Wake Forest College.
	Washington	Public Schools Library.
	Wilson	Atlantic Christian College.
North Dakota	Winston-Salem	Salem College.
	Bismarck	State Historical.
		State Law.
	Fargo	North Dakota Agricultural College and Experimental Station.
	Grand Forks	University of North Dakota.
Ohio	Minot	State Teachers College.
	Valley City	State Teachers College.
	Alliance	Mt. Union College.
	Ashland	Ashland College.
	Athens	Ohio University, Edwin Watts Chubb Library.
	Bowling Green	Bowling Green State University.
	Bucyrus	Bucyrus Public.
	Oxford	Miami University.
	Chillicothe	Public.
	Cincinnati	Public.
		University of Cincinnati.
	Cleveland	Case.
		Cleveland Public.
		Western Reserve University, Adelbert College Library.
	Columbus	Ohio State.
		Ohio State University.
		Columbus Public.
	Dayton	Dayton Public.
	Delaware	Ohio Wesleyan University, Charles Slocum Library.
	Gambier	Kenyon College.
Oklahoma	Granville	Denison University.
	Hiram	Hiram College.
	Marietta	Marietta College.
	Oberlin	Oberlin College.
	Portsmouth	Free Public.
	Springfield	Warder Public.
	Toledo	Toledo Public.
	Van Wert	Brumback Library of Van Wert County.
	Youngstown	Youngstown Public.
	Ada	East Central State Teachers College.
	Alva	Northwestern State Teachers College.
	Durant	Southeastern Teachers College.
	Edmond	Central State Teachers College.
	Enid	Carnegie Public.
	Langston	Langston University.
	Norman	University of Oklahoma.
	Oklahoma City	Oklahoma State.
	Shawnee	Oklahoma Baptist University.
	Stillwater	Agriculture and Mechanical College.
	Tahlequah	Northeastern State Teachers College.
	Tulsa	University of Tulsa.

State or territory	City	Name of library
Oregon.....	Corvallis.....	Oregon State Agricultural College.
	Eugene.....	University of Oregon.
	Forest Grove.....	Pacific University.
	Portland.....	Library Association of Portland. Reed College.
Pennsylvania.....	Salem.....	Oregon State.
	Allentown.....	Muhlenberg College.
	Bethlehem.....	Lehigh University.
	Bradford.....	Carnegie Public.
	Carlisle.....	J. Herman Bosler Memorial Library.
	Erie.....	Erie Public.
	Harrisburg.....	Pennsylvania State.
	Haverford.....	Haverford College.
	Huntingdon.....	Juniata College.
	Lancaster.....	Franklin and Marshall College, Fackenthal Library.
	Meadville.....	Allegheny College.
	Philadelphia.....	Free Library of Philadelphia, Department of Public Documents. Mercantile. Philadelphia Commercial Museum. University of Pennsylvania.
	Pittsburgh.....	Carnegie Free Library of Allegheny. Carnegie Library. University of Pittsburgh.
	Pottsville.....	Pottsville Public.
	Reading.....	Reading Public.
	Scranton.....	Scranton Public.
	State College.....	Pennsylvania State College.
	Swarthmore.....	Swarthmore College.
	Warren.....	Warren Library Association.
	Washington.....	Washington and Jefferson College, Memorial Library.
Philippine Islands....	Williamsport.....	James V. Brown Library.
	Manila.....	Department of Agriculture and Commerce, Sci- entific Library. The National Library, Public Documents Section. University of the Philippines.
Puerto Rico.....	Mayaguez.....	University of Puerto Rico, College of Agriculture and Mechanical Arts.
Rhode Island.....	Rio Piedras.....	University of Puerto Rico.
	Kingston.....	Rhode Island State College.
	Providence.....	Brown University. Providence Public. Rhode Island State.
	Westerly.....	Westerly Public.
South Carolina.....	Charleston.....	Charleston College. Charleston Library Society.
	Clemson.....	Clemson College.
	Clinton.....	Presbyterian College.
	Columbia.....	South Carolina State. University of South Carolina.
South Dakota.....	Greenwood.....	Greenwood Public.
	Rockhill.....	Winthrop College, Carnegie Library.
	Brookings.....	South Dakota State, Lincoln Memorial Library.
	Huron.....	Huron College.
	Mitchell.....	Dakota Wesleyan University.
	Pierre.....	South Dakota Free.
	Sioux Falls.....	Carnegie Free Public.
	Spearfish.....	Black Hills Teachers College.
	Vermilion.....	University of South Dakota.
	Yankton.....	Yankton College.
Tennessee.....	Chattanooga.....	Chattanooga Public.
	Clarksville.....	Austin Peay State College.
	Johnson City.....	East Tennessee State College.
	Knoxville.....	University of Tennessee.
	Memphis.....	Cossitt.
	Murfreesboro.....	State Teachers College.
	Nashville.....	Carnegie. Joint University Libraries. Tennessee State Library. University of the South.
	Sewanee.....	Hardin-Simmons University.
	Abilene.....	Texas State.
Texas.....	Austin.....	University of Texas, Documents Acquisition.
	Brownwood.....	Howard Payne College.
	Canyon.....	West Texas State Teachers College Library.
	College Station.....	Agriculture and Mechanical College of Texas.
	Commerce.....	East Texas State Teachers College.
	Corsicana.....	Public.
	Dallas.....	Dallas Public. Southern Methodist University.
	Denton.....	Texas State College for Women, College of Indus- trial Arts.
	El Paso.....	El Paso Public.
	Fort Worth.....	Fort Worth Public. Texas Christian University.

State or territory	City	Name of library
Texas (con't)	Galveston	Rosenberg Library.
	Georgetown	Southwestern University.
	Gilmer	East Mountain High School.
	Houston	Houston Public.
	Kingsville	Texas College of Arts and Industries.
	Lubbock	Texas Technological College.
	Marshall	Bishop College.
	San Antonio	Carnegie.
	Waco	Baylor University.
	Ephraim	Snow College.
Utah	Logan	Utah State Agricultural College.
	Ogden	Carnegie Free.
	Provo	Brigham Young University.
	Salt Lake City	University of Utah.
		Utah State.
Vermont	Burlington	University of Vermont.
	Middelbury	Middelbury College.
	Montpelier	Vermont State.
Virginia	Northfield	Norwich University.
	Blacksburg	Virginia Polytechnic Institute.
	Bridgewater	Bridgewater College.
	Danville	Averett College.
	Emory	Emory and Henry College.
	Fredericksburg	Mary Washington College.
	Hampden Sydney	Hampden Sydney College.
	Lexington	Virginia Military Institute.
		Washington and Lee University.
	Norfolk	Norfolk Public.
Washington	Petersburg	Virginia State College.
	Richmond	Virginia State.
	Salem	Roanoke College, Bittle Memorial Library.
	University	University of Virginia.
	University of Richmond P. O.	University of Richmond.
	Williamsburg	William and Mary College.
	Everett	Everett Public.
	Olympia	Washington State.
	Pullman	State College of Washington.
	Seattle	Seattle Public.
West Virginia		University of Washington.
	Spokane	Spokane Public.
	Tacoma	College of Puget Sound.
		Tacoma Public.
	Walla Walla	Whitman College.
	Athens	Concord State Normal.
	Charleston	State Library, Department of Archives and History.
	Elkins	Davis and Elkins College.
	Fairmont	Fairmont State Teachers College.
	Harpers Ferry	Storer College, Roger Williams Library.
Wisconsin	Huntington	Marshall College, James E. Morrow Library.
	Institute	West Virginia State College.
	Morgantown	West Virginia University.
	Salem	Salem College.
	Appleton	Lawrence College.
	Beloit	Beloit College.
	Eau Claire	Eau Claire Public.
	Fond du Lac	Fond du Lac Public.
	La Crosse	Public.
	Madison	State Historical Society.
Wyoming		University of Wisconsin.
		Wisconsin State.
	Milwaukee	Law Library of Milwaukee County.
		Milwaukee Public.
	Racine	Racine Public.
	Superior	Superior Public.
		Superior State Teachers College.
	Casper	Natrona County Public.
	Cheyenne	Wyoming State.
	Laramie	University of Wyoming.

BOUND VOLUMES

Bound volumes containing the Scientific Papers and the Technologic Papers may be purchased at the prices indicated below. Only seven bound volumes of the Technologic Papers, volumes 16 to 22, consecutively paged, were printed. Earlier Technologic Papers were published as separate articles, individually paged.

The first 14 volumes of the Scientific Papers were issued as the "Bulletin," and the separate papers were called "Reprints." Some

of these papers are available for purchase only in the quarterly numbers of the Bulletin; see list below.

In July 1928 the Scientific and Technologic Papers were combined and issued under the title "Bureau of Standards Journal of Research," and beginning with volume 13, July 1934, the name of the Journal was changed to "Journal of Research of the National Bureau of Standards."

SCIENTIFIC PAPERS

Volume	Issued	Containing		Available from Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at prices indicated		
		Number	Scientific paper numbers	Paper-bound number	Buckram-bound volume	Separately printed title page (TP), contents (C), and index (I), for unbound sets
				<i>Cents</i>		
1.....	1904-05	1	S1 to S8.....			
		2	S9 to S13.....			
		3	S14 to S25.....			
2.....	1906	1	S26 to S30.....			
		2	S31 to S39.....			
		3	S40 to S46.....			
3.....	1907	1	S47 to S54.....			
		2	S55 to S61.....		\$2	
		3	S62 to S65.....			
		4	S66 to S69.....			
4.....	1907-08	1	S70 to S76.....			
		2	S77 to S80.....			
		3	S81 to S86.....			
		4	S87 to S92.....			
5.....	1908-09	1	S93 to S96.....			
		2	S97 to S104.....		\$2	
		3	S105 to S108.....			
		4	S109 to S115.....			
6.....	1909-10	1	S116 to S123.....			
		2	S124 to S130.....		\$2	
		3	S131 to S136.....			
		4	S137 to S142.....			
7.....	1911	1	S143 to S150.....			
		2	S151 to S158.....		\$2	TP and C, 5c; I, 5c
		3	S159 to S165.....			
		4	S166 to S168.....			
8.....	1912	1	S169.....			
		2	S170 to S173.....			
		3	S174 to S181.....			
		4	S182 to S186.....			
9.....	1913	1	S187 to S193.....			
		2	S194 to S196.....			
		3	S197.....			
		4	S198 to S203.....			
10.....	1914	1	S204 to S206.....	25		
		2	S207 to S212.....	25	\$2	
		3	S213 to S218.....	25		
		4	S219 to S222.....	25		
11.....	1915	1	S223 to S229.....	25		
		2	S230 to S231.....	25		
		3	S232 to S237.....	25		
		4	S238 to S244.....	25		
12.....	1915-16	1	S245 to S250.....	25		
		2	S251 to S254.....	25	\$2	TP and C, 5c
		3	S255 to S257.....	25		
		4	S258 to S265.....	25		
13.....	1916-17	1	S266 to S271.....	25		
		2	S272 to S278.....	25	\$2	
		3	S279 to S285.....	25		
		4	S286 to S294.....	25		
14.....	1918-19	1	S295 to S302.....			
		2	S303 to S309.....	25	\$2	TP and C, 5c
		3	S310 to S317.....	25		
		4	S318 to S329.....	25		
15.....	1919-20		S330 to S368.....		\$2	I, TP, and C, 5c
16.....	1920		S369 to S404.....		\$2	TP and I, 5c
17.....	1922		S405 to S438.....		\$2	TP and I, 5c
18.....	1922-23		S439 to S468.....			
19.....	1923-24		S469 to S497.....			TP and I, 5c
20.....	1924-26		S498 to S523.....			TP and I, 5c
21.....	1926-27		S524 to S546.....			TP and I, 5c
22.....	1927-28		S547 to S572.....			TP and I, 5c

TECHNOLOGIC PAPERS ¹

Volume	Containing technologic papers ²	Bound volume	Combined title page contents and index for unbound sets ³	Issued	Volume	Containing technologic papers ²	Bound volume	Combined title page contents and index for unbound sets ³	Issued
			<i>Cents</i>					<i>Cents</i>	
1.....	T1 to T11.....			1910-12	12.....	T121 to T142.....			1919
2.....	T12 to T19.....			1912-14	13.....	T143 to T169.....			1919-20
3.....	T20 to T31.....			1911-16	14.....	T170 to T183.....			1920-21
4.....	T32 to T42.....			1913-14	15.....	T184 to T202.....			1921
5.....	T43 to T53.....			1914-15	16.....	T203 to T220.....	\$2	5	1921-22
6.....	T54 to T60.....			1915-16	17.....	T221 to T247.....	\$2	5	1922-24
7.....	T61 to T73.....			1916-17	18.....	T248 to T272.....	\$2	5	1924-25
8.....	T74 to T84.....			1916-17	19.....	T273 to T301.....	\$2	5	1924-25
9.....	T85 to T100.....			1916-17	20.....	T302 to T327.....	\$2	5	1925-26
10.....	T101 to T108.....			1917-18	21.....	T328 to T352.....	\$2	5	1926-27
11.....	T109 to T120.....			1918-19	22.....	T353 to T370.....	\$3	5	1927-28

¹ Prior to volume 16, this series was issued as individual papers only, not consecutively paged.

² Suggested volume grouping up to Technologic Paper 202. ³ Not issued prior to volume 16.

RESEARCH PAPERS

Volume	Issued	Number	Containing research papers	Available from Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at prices indicated		
				Paper-bound number	Bound volume	Separately printed combined title page, contents, and index for combined sets
				<i>Cents</i>		<i>Cents</i>
1.....	1928	1	RP1 to RP5.....			
		2	RP6 to RP10.....			
		3	RP11 to RP15.....			
		4	RP16 to RP23.....			
		5	RP24 to RP31.....			
		6	RP32 to RP36.....			
2.....	1929	1	RP37.....			
		2	RP38 to RP44.....			
		3	RP45 to RP49.....			
		4	RP50 to RP59.....			
		5	RP60 to RP66.....			
		6	RP67 to RP76.....			
3.....	1929	1	RP77 to RP90.....	30		
		2	RP91 to RP98.....	50		
		3	RP99 to RP107.....	50	\$2.75	5
		4	RP108 to RP111.....	40		
		5	RP112 to RP119.....	50		
		6	RP120 to RP128.....			
4.....	1930	1	RP129 to RP139.....			
		2	RP140 to RP151.....	40		
		3	RP152 to RP159.....		\$2.75	5
		4	RP160 to RP166.....	40		
		5	RP167 to RP175.....			
		6	RP176 to RP182.....	40		
5.....	1930	1	RP183 to RP193.....			
		2	RP194 to RP210.....			
		3	RP211 to RP229.....		\$2.75	5
		4	RP230 to RP242.....			
		5	RP243 to RP253.....			
		6	RP254 to RP258.....	40		
6.....	1931	1	RP259 to RP267.....	40		
		2	RP268 to RP278.....	40		
		3	RP279 to RP291.....	40	\$2.75	5
		4	RP292 to RP302.....			
		5	RP303 to RP313.....			
		6	RP314 to RP328.....			

RESEARCH PAPERS—Continued

Volume	Issued	Number	Containing research papers	Available from Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at prices indicated		
				Paper-bound number	Bound volume	Separately printed combined title page, contents, and index for combined sets
				<i>Cents</i>		<i>Cents</i>
7.....	1931	1	RP329 to RP338.....		\$3.00	5
		2	RP339 to RP347.....			
		3	RP348 to RP360.....			
		4	RP361 to RP371.....			
		5	RP372 to RP386.....			
8.....	1932	6	RP387 to RP395.....	40	\$3.00	5
		1	RP396 to RP406.....	40		
		2	RP407 to RP415.....	40		
		3	RP416 to RP426.....	40		
		4	RP427 to RP433.....	40		
9.....	1932	5	RP434 to RP445.....		\$3.00	5
		6	RP446 to RP452.....	40		
		1	RP453 to RP460.....	20		
		2	RP461 to RP470.....	25		
		3	RP471 to RP481.....	25		
10.....	1933	4	RP482 to RP492.....		\$3.00	5
		5	RP493 to RP500.....			
		6	RP501 to RP511.....			
		1	RP512 to RP521.....			
		2	RP522 to RP530.....			
11.....	1933	3	RP531 to RP539.....	25	\$3.00	5
		4	RP540 to RP548.....	25		
		5	RP549 to RP560.....	25		
		6	RP561 to RP572.....	25		
		1	RP573 to RP583.....			
12.....	1934	2	RP584 to RP592.....	25	\$3.00	5
		3	RP593 to RP599.....			
		4	RP600 to RP608.....			
		5	RP609 to RP619.....			
		6	RP620 to RP629.....	25		
13.....	1934	1	RP630 to RP638.....	25	\$3.00	5
		2	RP639 to RP652.....			
		3	RP653 to RP665.....	25		
		4	RP666 to RP675.....			
		5	RP676 to RP684.....			
14.....	1935	6	RP685 to RP690.....		\$3.00	5
		1	RP691 to RP698.....	25		
		2	RP699 to RP708.....	25		
		3	RP709 to RP717.....	25		
		4	RP718 to RP728.....	25		
15.....	1935	5	RP729 to RP742.....	25	\$3.00	5
		6	RP743 to RP752.....			
		1	RP753 to RP758.....			
		2	RP759 to RP765.....			
		3	RP766 to RP774.....			
16.....	1936	4	RP775 to RP783.....		\$3.00	5
		5	RP784 to RP793.....	25		
		6	RP794 to RP803.....			
		1	RP804 to RP814.....			
		2	RP815 to RP821.....	25		
17.....	1936	3	RP822 to RP831.....	25	\$3.00	5
		4	RP832 to RP839.....	25		
		5	RP840 to RP848.....	25		
		6	RP849 to RP856.....			
		1	RP857.....			
18.....	1936	2	RP858 to RP867.....		\$3.00	5
		3	RP868 to RP873.....			
		4	RP874 to RP880.....	25		
		5	RP881 to RP888.....			
		6	RP889 to RP893.....	25		
19.....	1936	1	RP899 to RP906.....		\$3.00	5
		2	RP907 to RP912.....	25		
		3	RP913 to RP924.....			
		4	RP925 to RP932.....	25		
		5	RP933 to RP945.....	25		
20.....	1936	6	RP946 to RP956.....		\$3.00	5

RESEARCH PAPERS—Continued

Volume	Issued	Number	Containing research papers	Available from Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at prices indicated		
				Paper-bound number	Bound volume	Separately printed combined title page, contents, and index for combined sets
				<i>Cents</i>		<i>Cents</i>
18.....	1937	1	RP957 to RP965.....			
		2	RP966 to RP974.....			
		3	RP975 to RP982.....		\$3.00	5
		4	RP983 to RP989.....			
		5	RP990 to RP999.....			
		6	RP1000 to RP1005.....	25		
19.....	1937	1	RP1006 to RP1015.....			
		2	RP1016 to RP1022.....	25		
		3	RP1023 to RP1030.....	25	\$3.00	5
		4	RP1031 to RP1039.....	25		
		5	RP1040 to RP1049.....	25		
		6	RP1050 to RP1058.....	25		
20.....	1938	1	RP1059 to RP1068.....	25		
		2	RP1069 to RP1077.....	25		
		3	RP1078 to RP1084.....	25	\$3.00	5
		4	RP1085 to RP1091.....			
		5	RP1092 to RP1101.....			
		6	RP1102 to RP1109.....	25		
21.....	1938	1	RP1110 to RP1119.....	30		
		2	RP1120 to RP1128.....	30		
		3	RP1129 to RP1136.....	30	\$3.00	
		4	RP1137 to RP1142.....	30		
		5	RP1143 to RP1150.....	30		
		6	RP1151 to RP1162.....	30		
22.....	1939	1	RP1163 to RP1171.....	30		
		2	RP1172 to RP1178.....	30		
		3	RP1179 to RP1188.....	30	\$3.00	5
		4	RP1189 to RP1199.....	30		
		5	RP1200 to RP1208.....	30		
		6	RP1209 to RP1217.....	30		
23.....	1939	1	RP1218 to RP1227.....	30		
		2	RP1228 to RP1236.....	30		
		3	RP1237 to RP1244.....	30	\$3.00	5
		4	RP1245 to RP1251.....			
		5	RP1252 to RP1258.....			
		6	RP1259 to RP1265.....	30		
24.....	1940	1	RP1266 to RP1272.....	30		
		2	RP1273 to RP1279.....			
		3	RP1280 to RP1286.....	30	\$3.00	5
		4	RP1287 to RP1294.....	30		
		5	RP1295 to RP1301.....	30		
		6	RP1302 to RP1309.....	30		
25.....	1940	1	RP1310 to RP1317.....	30		
		2	RP1318 to RP1323.....	30		
		3	RP1324 to RP1332.....	30	\$3.00	5
		4	RP1333 to RP1340.....	30		
		5	RP1341 to RP1345.....	30		
		6	RP1346 to RP1353.....	30		
26.....	1941	1	RP1354 to RP1361.....	30		
		2	RP1362 to RP1367.....	30		
		3	RP1368 to RP1374.....	30	\$3.00	5
		4	RP1375 to RP1382.....	30		
		5	RP1383 to RP1389.....			
		6	RP1390 to RP1397.....	30		
27.....	1941	1	RP1398 to RP1405.....			
		2	RP1406 to RP1414.....	30		
		3	RP1415 to RP1422.....	30	\$3.00	
		4	RP1423 to RP1428.....	30		
		5	RP1429 to RP1434.....	30		
		6	RP1435 to RP1443.....	30		
28.....	1942	1	RP1444 to RP1448.....	30		
		2	RP1449 to RP1454.....	30		
		3	RP1455 to RP1460.....	30	\$3.00	5
		4	RP1461 to RP1467.....	30		
		5	RP1468 to RP1472.....	30		
		6	RP1473 to RP1479.....	30		

RESEARCH PAPERS—Continued

Volume	Issued	Number	Containing research papers	Available from Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at prices indicated		
				Paper-bound number	Bound volume	Separately printed combined title page, contents, and index for combined sets
				<i>Cents</i>		<i>Cents</i>
29.....	1942	1	RP1480 to RP1488.....			
		2	RP1489 to RP1494.....	30		
		3	RP1495 to RP1498.....	30	\$3.00	5
		4	RP1499 to RP1501.....	30		
		5	RP1502 to RP1506.....	30		
30.....	1943	6	RP1507 to RP1512.....			
		1	RP1513 to RP1518.....	30		
		2	RP1519 to RP1525.....		\$3.00	5
		3	RP1526 to RP1530.....	30		
		4	RP1531 to RP1536.....			
31.....	1943	5	RP1537 to RP1540.....			
		6	RP1541 to RP1544.....	30		
		1	RP1545 to RP1548.....	30		
		2	RP1549 to RP1552.....		\$3.00	5
		3	RP1553 to RP1557.....			
32.....	1944	4	RP1558 to RP1562.....	30		
		5	RP1563 to RP1566.....			
		6	RP1567 to RP1569.....	30		
		1	RP1570 to RP1572.....	30	\$3.00	5
		2	RP1573 to RP1575.....	30		
33.....	1944	3	RP1576 to RP1579.....	30		
		4	RP1580 to RP1583.....	30		
		5	RP1584 to RP1587.....			
		6	RP1588 to RP1591.....	30		
		1	RP1592 to RP1596.....	30	\$3.00	5
34.....	1945	2	RP1597 to RP1601.....			
		3	RP1602 to RP1605.....			
		4	RP1606 to RP1611.....	30		
		5	RP1612 to RP1617.....	30		
		6	RP1618 to RP1623.....	30		
35.....	1945	1	RP1624 to RP1630.....	30	\$3.00	5
		2	RP1631 to RP1637.....	30		
		3	RP1638 to RP1644.....	30		
		4	RP1645 to RP1650.....	30		
		5	RP1651 to RP1655.....	30		
36.....	1946	6	RP1656 to RP1659.....	30	\$3.00	5
		1	RP1660 to RP1663.....	30		
		2	RP1664 to RP1667.....	30		
		3	RP1668 to RP1670.....	30		
		4	RP1671 to RP1675.....	30		
37.....	1946	5	RP1676 to RP1680.....	30	\$3.00	5
		6	RP1681 to RP1687.....			
		1	RP1688 to RP1692.....	30		
		2	RP1693 to RP1699.....	30		
		3	RP1700 to RP1704.....	30		
38.....	1947	4	RP1705 to RP1711.....	30	\$4.00	
		5	RP1712 to RP1717.....	30		
		6	RP1718 to RP1722.....	30		
		1	RP1723 to RP1729.....	30		
		2	RP1730 to RP1735.....	30		
39.....	1947	3	RP1736 to RP1741.....	30	\$4.00	
		4	RP1742 to RP1746.....	30		
		5	RP1747 to RP1750.....	30		
		6	RP1751 to RP1757.....	30		
		1	RP1758 to RP1764.....	30		
40.....	1947	2	RP1765 to RP1772.....	30	\$4.00	
		3	RP1773 to RP1779.....	60		
		4	RP1780 to RP1786.....	40		
		5	RP1787 to RP1795.....	55		
		6	RP1796 to RP1806.....	45		

2. PERIODICALS OF THE BUREAU

JOURNAL OF RESEARCH OF THE NATIONAL BUREAU OF STANDARDS

Complete scientific reports of the Bureau's research and development, both experimental and theoretical, in physics, chemistry, and

engineering and the results of test and instrumentation activities in these fields are printed in this Journal. The subject matter of the reports embraces the fields of electricity, electronics, atomic physics, applied mathematics, mechanics and sound, radio and radio propagation, optics, heat and power, metallurgy, metrology, ordnance, physical chemistry, mineral products, organic and fibrous materials, and building technology. Since the inception of the Journal of Research in 1928, over 1,800 Research Papers have been published. Titles and abstracts of these papers are included in this Circular.

NATIONAL BUREAU OF STANDARDS TECHNICAL NEWS BULLETIN

This monthly publication summarizes the current research, development, and test activities of the Bureau. The articles are brief, with emphasis on the results of research and their significance, chosen for their importance to other scientists, engineers, and to industry. Resumes of longer research reports, important national and international conferences on fundamental science in which the Bureau has represented the Nation, and a bibliography of all publications by members of the staff as published are included. Within its 12 monthly pages the Bulletin is designed to give a succinct account of the current work of the Bureau.

BASIC RADIO PROPAGATION PREDICTIONS

This is a monthly publication for those concerned with radio communication in determining the best sky-wave frequencies over any path at any time of day for average conditions for the month of prediction, which are made three months in advance. Charts of extraordinary-wave critical frequency for the F2 layer and of maximum usable frequency for a transmission distance of 4,000 km, of highest frequency of sporadic-E in excess of 15 Mc are included. In addition, there are various maps, charts, diagrams, and nomograms needed to make practical application of the world-contour charts, together with examples of their use.

ANNUAL SUBSCRIPTION	United States Canada, Cuba Mexico Newfoundland Republic of Panama	Other ¹ coun- tries
Send order, with remittance, to Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.		
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TECHNICAL NEWS BULLETIN, 12 monthly issues.....	1.00	1.35
BASIC RADIO PROPAGATION PREDICTIONS, 12 monthly issues..	1.00	1.25

¹ Additional amount for postage not required.

3. TITLES AND ABSTRACTS OF PUBLICATIONS

Where prices are shown the publication may be purchased from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. If the price is omitted, the publication is out of print, but may be consulted in libraries maintaining reference sets of Bureau publications. Abstracts of publications issued prior to January 1, 1942, are included in Circular C24 and Supplements.

The letter-symbol designations given below are used in this Circular for the publication series indicated, and these letters should be included with the serial number in all references to Bureau publications.

S, Scientific Papers.
T, Technologic Papers.
J, Journal of Research.
RP, Research Papers.
C, Circulars.
H, Handbooks.
M, Miscellaneous Publications.

R, Simplified Practice Recommendations.
CS, Commercial Standards.
BMS, Building Materials and Structures Reports.
BH, Building and Housing Publications.
MT, Mathematical Tables.

SCIENTIFIC PAPERS

Results of research in science and technology were reported in the Scientific Papers. The first 14 volumes of the Scientific Papers were issued as the "Bulletin of the Bureau of Standards" and the separate papers were called "Reprints".

SCIENTIFIC PAPERS FROM BULLETIN OF THE BUREAU OF STANDARDS, VOLUME 1, 1904-05

- S1. Recomparison of the United States prototype meter. L. A. Fischer.
- S2. A study of the silver voltameter. K. E. Guthe.
- S3. The so-called international electrical units. Frank A. Wolff.
- S4. The spectra of mixed gases. P. G. Nutting.
- S5. On secondary spectra and the conditions under which they may be produced. P. G. Nutting.
- S6. Some new rectifying effects in conducting gases. P. G. Nutting.
- S7. On fibers resembling fused quartz in their elastic properties. K. E. Guthe.
- S8. On the temperature of the arc. C. W. Waidner and G. K. Burgess.
- S9. The absolute measurement of inductance. E. B. Rosa and F. W. Grover.
- S10. The absolute measurement of capacity. E. B. Rosa and F. W. Grover.
- S11. Optical pyrometry. C. W. Waidner and G. K. Burgess.
- S12. On the theory of the Matthews and the Russell-Leonard photometers for the measurement of mean spherical and mean hemispherical intensities. Edward P. Hyde.
- S13. The testing of clinical thermometers. C. W. Waidner and L. A. Fischer.
- S14. Measurement of inductance by Anderson's method, using alternating currents and a vibration galvanometer. E. B. Rosa and F. W. Grover.
- S15. Use of terpentine in standards of inductance. E. B. Rosa and F. W. Grover.
- S16. The silver coulometer. K. E. Guthe.
- S17. History of the standard weights and measures of the United States. L. A. Fischer.
- S18. Wattmeter methods of measuring power expended upon condensers and circuits of low power factor. Edward B. Rosa.
- S19. The relative intensities of metal and gas spectra from electrically conducting gases. P. G. Nutting.
- S20. The use of white walls in a photometric laboratory. Edward P. Hyde.
- S21. Influence of wave form on the rate of integrating induction wattmeters. E. B. Rosa, M. G. Lloyd, and C. E. Reid.
- S22. Detector for small alternating currents and electrical waves. L. W. Austin.
- S23. The positive charges carried by the canal rays. L. W. Austin.
- S24. Radiation from platinum at high temperatures. G. K. Burgess.
- S25. A five-thousand volt generator set. P. G. Nutting.

SCIENTIFIC PAPERS FROM BULLETIN OF THE BUREAU OF STANDARDS, VOLUME 2, 1906

- S26. Talbot's law as applied to the rotating sector disk. Edward P. Hyde.
- S27. A new determination of the electromotive force of Weston and Clark standard cells by an absolute electro-dynamometer. K. E. Guthe.
- S28. The Gray absolute electro-dynamometer. Edward B. Rosa.
- S29. Construction and calculation of absolute standards of inductance. J. G. Coffin.
- S30. An efficiency meter for electric incandescent lamps. E. P. Hyde and H. B. Brooks.
- S31. Calculation of the self-inductance of single-layer coils. Edward B. Rosa.
- S32. Heat treatment of high-temperature mercurial thermometers. Hobert C. Dickinson.
- S33. A new potentiometer for the measurement of electromotive force and current. H. B. Brooks.
- S34. Spectrum lines as light sources in polariscopic measurements. Frederick Bates.
- S35. Polarimetric sensibility and accuracy. P. G. Nutting.
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- S46. A vacuum radiomicrometer. W. W. Coblentz.

SCIENTIFIC PAPERS FROM BULLETIN OF THE BUREAU OF STANDARDS, VOLUME 3, 1907

- S47. On the geometrical mean distances of rectangular areas and the calculation of self-inductance. Edward B. Rosa.
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SCIENTIFIC PAPERS FROM BULLETIN OF THE BUREAU OF STANDARDS, VOLUME 4, 1907-08

- S70. Clark and Weston standard cells. F. A. Wolff and C. E. Waters.
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SCIENTIFIC PAPERS FROM BULLETIN OF THE BUREAU OF STANDARDS, VOLUME 6, 1909-10

- S116. The determination of the ratio of transformation and of the phase relations in transformers. E. B. Rosa and Morton G. Lloyd.
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SCIENTIFIC PAPERS FROM BULLETIN OF THE BUREAU OF STANDARDS, VOLUME 7, 1911

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SCIENTIFIC PAPERS FROM BULLETIN OF THE BUREAU OF STANDARDS, VOLUME 12, 1915-16

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- S249. The emissivity of metals and oxides. IV. Iron oxide. George K. Burgess and Paul D. Foote.
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SCIENTIFIC PAPERS FROM BULLETIN OF THE BUREAU OF STANDARDS, VOLUME 13, 1916-17

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Results of investigations of materials and methods of testing were reported in the Technologic Papers.

In July 1928 the Scientific and Technologic Papers were combined and issued under the title "Bureau of Standards Journal of Research," and beginning with volume 13, July 1934, the name of the Journal was changed to "Journal of Research of the National Bureau of Standards."

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RESEARCH PAPERS FROM JOURNAL OF RESEARCH OF THE NATIONAL BUREAU OF STANDARDS, VOLUME 28, JANUARY—JUNE 1942

- RP1444. The tee-bend test to compare the welding quality of steels. George A. Ellinger, A. G. Bissell, and Morgan L. Williams.

A bend test for comparing the welding quality of steels is described in this paper. Specimens of fillet-welded T-sections of a number of low-alloy high-tensile steels were bent in special testing jigs at room temperature and at temperatures as low as -20° F. Several criteria, such as maximum load, angle at maximum load, type and location of fractures, were used to compare the specimens. A special method of statistical analysis, which is described in detail in the paper, was used to evaluate the data and to compare and rate the welding quality of the steels. 49 p. 30c.

- RP1445. Expansivity of a Vycor brand glass. James B. Saunders.

In a study of a new glass (96 percent silica, glass No. 790) used in heat-resisting glassware, its expansivity is compared with that of fused quartz. For this comparison a modification of Fizeau's method for determining very small differences in linear expansion was used and is presented. This method has the advantage of permitting the use of relatively long samples, the procurement of very sharp and well-defined interference bands, and the almost complete elimination of the effect of changes in the refractive index of air on the results.

The results indicate that the No. 790 glass has a coefficient of expansion approximately twice that of fused quartz at room temperature, an expansivity equal to fused quartz at approximately 300° C, and an expansivity less than one-half of that for fused quartz in the neighborhood of 700° C. 5 p. 5c.

- RP1446. Soil-corrosion studies, 1939. Coatings for the protection of metals underground. Kirk H. Logan.

In this paper is reported the condition of specimens of metallic and nonmetallic coatings after exposure to soils for periods ranging from 2 to 16 years. Conclusions previously drawn relative to the protective value of zinc and lead coatings are generally confirmed by the latest inspections. A specially applied zinc coating prevented serious pitting in 16 soils over a 16-year period, but a commercial coating of the same weight, exposed to more corrosive soils, did not prevent pitting entirely during the initial 2-year period. Lead corrodes sufficiently in many soils to render lead coatings unsatisfactory. Tin applied as a protective coating was of little benefit in reducing the corrosion of copper in soils. A 7-year-old vitreous enamel, two 7-year-old hard-rubber coatings, and a 2-year-old baked synthetic resin coating have shown little or no evidence of failure. 15 p. 5c.

- RP1447. Elastic properties of some alloy cast irons. Alexander I. Krynetsky and Charles M. Saeger, Jr.

Transverse-strength properties were determined on 1.2-in.-diameter test bars made from three types of alloy iron heated, before casting, to the maximum temperatures of 1,400°, 1,500°, 1,600°, and 1,700° C. The bars were vertically cast, bottom-poured in green-sand molds, at a temperature of 100°, 150°, 200°, or 250° C above

the liquidus. Total, plastic, and elastic deflection, modulus of rupture, relative moduli of elasticity, and total, plastic, and elastic resilience were determined, and the microstructure of the test bars was examined. Comparative values of four different relative moduli of elasticity relating to the same test bars but calculated by different methods are discussed. Comparison of transverse test properties of alloy and plain carbon irons is made. 22 p. 15c.

RP1448. Application of the dropping-mercury electrode to the investigation of the polyhydroxy acids and lactones. Harry Matheson, Horace S. Isbell, and Edgar Reynolds Smith.

The polarographic method is used in a study of the polyhydroxymonocarboxylic acids, their lactones, lactides, and other condensation products. With a tetraethylammonium chloride environment, polarographic waves are obtained which show the behavior of the hydroxy acids and their lactones with respect to electrolytic reduction and the products which they form in dilute aqueous solution.

Freshly prepared solutions of the aldonic acids give the ordinary hydrogen wave but do not give waves which correspond to the reduction of the carboxyl group. When a solution containing an aldonic acid is allowed to stand, the wave due to the hydrogen ion decreases and a wave caused by the gamma lactone appears. In the presence of oxygen a wave, apparently caused by some substance produced by the interaction of the sugar acid, mercury, and oxygen, forms at about -1.1 v. The formation of this wave is accompanied by a corresponding decrease in the hydrogen wave. Freshly prepared solutions of the delta lactones of the aldonic acids give waves at about -2.3 v, with respect to a mercury anode, which appear to be due to the reduction of the lactones. The heights of these waves decrease with time until, after several hours, they disappear. The absence of an appreciable delta lactone wave in a 0.01 *M* aqueous solution of an aldonic acid shows that the position of the equilibrium between the free acid and the delta lactone is far toward the free acid. The gamma lactones of the aldonic acids give polarographic waves at potentials slightly higher than the delta lactones. When a solution containing a gamma lactone is allowed to stand, the height of the gamma lactone wave decreases while a wave corresponding to the reduction of the hydrogen ion appears. The inflection points for the gamma lactone waves vary only slightly with the configuration of the groups comprising the lactone structure. This small variation in the inflection points shows a regularity which indicates that the stereomeric positions of the hydroxyl groups are of importance. When the hydroxyl of carbon 2 and the residual carbon group attached to carbon 4 are in the *cis* position, the reduction potential seems to be higher than it is when these groups are in the *trans*-position. 37 p. 10c.

RP1449. An absolute determination of the ampere, using helical and spiral coils. Roger W. Curtis, Raymond L. Driscoll, and Charles L. Critchfield.

The value of an electric current has been measured in absolute units by a current balance, and simultaneously in international units by standard cells and standard resistors. In the current balance a subdivided helix served as the two fixed coils and, as the moving coil, either a short helix or a compact spiral. The two moving coils were the same ones that were described in a previous paper in which the fixed coils were spirals.

The value obtained when using these two moving coils and the subdivided helix differs by only 4 parts in a million from the value obtained when using these moving coils and spirally wound fixed coils. These values are, however, somewhat different from those obtained when using multilayer coils wound with copper wire. The relationship between the absolute and international ampere, from the most dependable measurements at the National Bureau of Standards, may be expressed as

$$1 \text{ NBS international ampere} = 0.999\,850 \text{ absolute ampere.}$$

In the preceding paper published by members of the Bureau staff on this subject the value given was $1 \text{ NBS international ampere} = 0.999\,860 \text{ absolute ampere.}$ 25 p. 10c.

RP1450. Rectangular plate loaded along two adjacent edges by couples in its own plane. William R. Osgood.

A. and L. Föppl give an approximate solution for the stresses in the rectangular knee of an L-shaped plate loaded by couples acting on the legs in the plane of the plate. A solution is presented here that is exact in the sense that the equations of equilibrium and the condition of compatibility (for two-dimensional systems) are satisfied at every point. Small self-equilibrated stresses remain along the free edges of the knee. 5 p. 5c.

RP1451. Spark spectrographic analysis of commercial tin. Bourdon F. Scribner.

A procedure is described in detail for the simultaneous spectrographic determination of antimony, arsenic, bismuth, cadmium, copper, indium, iron, lead, silver, and zinc in tin metal of commercial grades. The preparation of standards and samples by chill-casting of tin in open molds and in evacuated tubes is described. The use of a press is found convenient in forming electrodes from tin metal. The characteristics of the tin spark under varied operating conditions are discussed in connection with the selection of optimum conditions of excitation. Application of the step sector provides a means of extending the range of line intensity measurements with the microphotometer as well as for plate calibration. Rapid reduction of the photometric measurements to intensities is made by a modified graphical calculator. The shapes of the analytical curves derived from measurements on tin standards are compared, and deviations from the ideal case are discussed. Repeated determinations on homogeneous samples show a standard deviation of from 1.0 to 2.5 percent. Single determinations in routine analysis are estimated to fall within 5 percent of the actual concentration, with few exceptions. The analyses are carried out on groups of six samples in a working time of 5 minutes per determination. 26 p. 10c.

RP1452. Calculation of protein-anion affinity constants from acid titration data Jacinto Steinhardt.

It has been shown earlier that the titration curves of wool and other proteins obtained with different strong acids differ widely in position with respect to the pH coordinate. By assuming that these differences were due to combination of the protein with anions as well as with hydrogen ions, it was possible to calculate from the pH of the midpoint of each curve numerical values of the affinity of each anion for wool. In the present paper, modifications of the equations for calculating anion affinity are described. It is shown that the new equations described the titration curves as a whole instead of merely the positions of their midpoints. The new forms are also shown to describe the effects of the presence of salts on the titration curves at least as adequately as did the earlier ones. 9 p. 5c.

RP1453. Further investigations of the affinities of anions of strong acids for wool protein. Jacinto Steinhardt, Charles H. Fugitt, and Milton Harris.

Titration curves of wool with 18 strong acids at 0°, 25°, or 50° C have been added to the data for 19 others presented earlier. Several have been investigated at more than one temperature. The reversibility of the equilibria measured has been demonstrated quantitatively. New anion-wool dissociation constants, based on modifications of equations previously used to calculate anion-wool affinities, are tabulated for 33 anions, and heats of dissociation of a few anion-wool complexes are also given. The previously reported tendency of affinity to rise with molecular-weight is confirmed; fairly consistent relationships between the affinity and the molecular weights of strong organic acids appear. 16 p. 5c.

RP1454. Intercomparison of platinum resistance thermometers between -190° and 445°C. Harold J. Hoge and Ferdinand G. Brickwedde.

Eight platinum resistance thermometers satisfying the requirements of the International Temperature Scale were calibrated on the international scale and intercompared from -190° to 445° C. The δ 's of the Callendar-Van Dusen equations for seven of these thermometers ranged from 1.49375 to 1.49862. The δ for the eighth thermometer, E , was 1.51155. After minimizing the effects of relative calibration errors, the maximum difference between the readings of the group of seven thermometers was 7 millidegrees between -190° and 0° C and 1.3 millidegrees between 0° and 100° C. Maximum differences from the mean were 4.0 and 0.3 millidegree, respectively. For thermometer E , deviations from the mean of the other seven were 15 millidegrees at -110° C and 3 millidegrees at +50° C. Tables of differences between readings of platinum resistance thermometers arising from assumed calibration errors at the fixed points were calculated and are included. 24 p. 10c.

RP1455. An experimental study of beater practice in the manufacture of offset papers. Charles G. Weber, Merle B. Shaw, Martin N. Geib, and Martin J. O'Leary.

Sixty-three experimental papers were made in the Bureau's semicommercial mill in studies to determine the relationship between the mechanical beating of the fibers and the properties of paper for multicolor offset printing. A series of papers was made from each of the kinds of wood fibers commonly used in offset papers and from various mixtures of these fibers. Each series comprised papers made with widely different degrees of beating, and the effects of the variations were determined by laboratory and printing tests of the papers.

The data obtained indicate that for the best results in multicolor printing, the papers should be made with the minimum of beating necessary to obtain the required formation and finish. The formation of gel on the fibers should be carefully controlled, because the high strength associated with gel, particularly high folding endurance, is directly opposed to several of the properties most important in multicolor lithography.

The admixture of filler pulp with a strong pulp such as sulfite lessens the adverse effects of beating and assists in obtaining suitable formation and finish. The best all-around results were obtained with sulfite-soda and sulfate-soda mixtures. Deinked book stock had excellent opacity, but papers containing appreciable amounts of it curled excessively. 24 p. 10c.

RP1456. Spectrophotometric determination of dysprosium, holmium, erbium, thulium, and ytterbium. Clement J. Rodden.

The transmittancies of solutions of the nitrates of dysprosium, holmium, erbium, thulium, and ytterbium were measured, over the range 350 to 1,000 $m\mu$, by means of a double-monochromator photoelectric spectrophotometer. Terbium and yttrium show no appreciable absorption in this range. The bands found most suitable for determination of the five elements are: for dysprosium, at 910 $m\mu$; for holmium, at 643 $m\mu$; for erbium, at 521 $m\mu$ and 653 $m\mu$; for thulium, at 684 $m\mu$; and for ytterbium, at 950 $m\mu$ and 973 $m\mu$.

Measurements were also made of the variation with concentration of the transmittancies of solutions of the nitrates of the five elements at the wavelengths given. The results obtained were applied to the analysis of several mixtures of rare-earth oxides. The procedure supplements a similar one, previously published, for the analysis of mixtures of rare earths of the cerium group. 13 p. 10c.

RP1457. Dielectric constant, power factor, and conductivity of the system rubber-calcium carbonate. Arnold H. Scott and Archibald T. McPherson.

The dielectric constants and power factors of mixtures of calcium carbonate with Vistanex and with natural rubber were determined at 1 and 100 kilocycles per second. There was little difference between the values at the two frequencies. Two different formulas were found to express the dielectric constants of the mixtures as functions of the dielectric constants of the respective components. The dielectric constant of the pure calcium carbonate employed was determined by the method of liquid mixtures. The power factors of the rubber-calcium carbonate mixtures were intermediate between those of the components. The conductivities of the Vistanex-calcium carbonate mixtures measured at the end of 1 minute of electrification were intermediate between those of the components, but the conductivities of the mixtures of natural rubber and calcium carbonate seemed to go through a minimum. 18 p. 10c.

RP1458. Temperature estimates of the planet Mars, 1924 and 1926. W. W. Coberly.

In earlier publications (S512 and S553), data were given on the planetary radiation emanating from different parts of the surface of Mars as measured with a thermocouple and filters. From these radiometric measurements, planetary temperatures were calculated by five methods, using the transmission data of the earth's atmosphere at 7 to 15 μ , published by Fowle in the Smithsonian Physical Tables. In the meantime, based upon observations at Flagstaff, Ariz. (elevation 7,250 ft.), Adel and Lampland have published atmosphere transmissions that appear to be somewhat different from the Smithsonian measurements, in the spectral band extending from 7 to 15 μ .

Since the planetary-radiation measurements were made at Flagstaff, the data obtained during the oppositions of Mars in 1924 and in 1926 have been recalculated, using the atmospheric transmissions observed at that station. In the present communication the five methods and procedures previously used, by three calculators, in deriving planetary temperatures are reviewed, and it is shown that in four of these methods of calculation, which employ the law of total radiation of a black body, there is but little difference in the planetary temperatures deduced by using the transmission coefficients of the earth's atmosphere published by these two sets of observers. This is owing to the fortuitous circumstance that, while they differ in spectral outline, there is but little difference in the total areas encompassed by these two transmission curves, and hence, in the calculated total amount of planetary radiation transmitted by the earth's atmosphere. Hence, no revision is made of the planetary temperatures previously deduced by the four methods involving the law of total radiation.

On the other hand, the fifth method, using the law of spectral radiation of a black body and the Flagstaff transmission coefficients of the atmosphere, gives planetary temperatures that are entirely different from the values previously deduced by this method, and by the four other methods, by applying the Smithsonian data. This

inconsistency can be eliminated, at least in part, and the data harmonized by taking into consideration selective emission of the planetary surface.

On the assumption that the surface of Mars, like that of the earth, is composed of silicates (feldspar, mica, silica, etc.) which have a high selective emission at 8 to 10 μ , the temperatures derived from the spectral components of planetary radiation of Mars, measured in 1926, are in good agreement with the values calculated by other methods that are less affected by selective spectral emission. From this it would appear that, assuming that the temperatures deduced by the other methods of calculation are indicative of meteorological conditions at the time of making the observations, the fluorite-filter method of analysis may be a useful means of securing information on the selective spectral emission of the planetary surface.

In a supplementary note a new thermocouple, made of bismuth and Chromel-P wires, suitable for planetary radiometry is described. 13 p. 5c.

RP1459. Tensile elastic properties of nickel, copper, open-hearth iron, and typical steels. Dunlap J. McAdam, Jr., and Russell W. Mebs.

From stress-set curves are derived proof stresses for five values of permanent set. From corrected stress-strain curves are derived values of the modulus at zero stress and its stress coefficient. The diagrams show the influence of prior plastic extension on these indices.

The curves of variation of the proof stresses with plastic extension are affected by the rate of work-hardening, by variation of internal stresses of two kinds, and by the rest interval. The curves of variation of the modulus of elasticity with plastic extension are affected by variation of crystal orientation, internal stress, and lattice expansion, and by rest. The curves of variation of the stress coefficients of the modulus are affected by all these factors except possibly the reorientation factor. 68 p. 15c.

RP1460. Soil-corrosion studies, 1939: Ferrous and nonferrous corrosion-resistant materials. Kirk H. Logan.

Since the beginning of the Bureau's soil-corrosion investigation in 1922, specimens of a wide variety of materials suggested for service underground have been exposed to various soil conditions and inspected at regular intervals. In this paper is reported the condition of the specimens of ferrous and nonferrous metals after underground exposures of from 2 to 17 years. Because of the variety of environmental conditions represented at the test sites, some idea of the corrosion resistance of the materials in most of the corrosive environments commonly encountered in soils can be obtained. Relations between corrodibility and chemical composition are indicated for certain classes of materials. 22 p. 10c.

RP1461. Some properties of the dry air-setting type of refractory bonding mortar. Raymond A. Heindl and William L. Pendergast.

Seventeen brands of air-setting refractory mortars of the type marketed in the dry condition were investigated in the unheated state with regard to tempering water, fineness of grain, soluble alkali content, pyrometric-cone equivalent, suitability for troweling and dipping, drying and setting properties, and strength. After heat treatments at various final temperatures the strengths of the mortars were determined. In rupturing assemblages of two half-brick and mortar, the types of failures were noted. The tendency of the mortars to shrink, crack, and flow when exposed to high temperatures, both in fusion blocks and in units of three brick each, was also investigated.

The ingredients of the mortars were all fine-grained, only a small amount being retained on a No. 40 sieve. The strengths of the neat mortars covered a wide range; the strengths of those received and stored in metal drums indicated the desirability of storage in airtight containers. In a series of heat treatments the neat mortars in general were found to have the least strength when preheated at 750° C. However, the least strengths of the majority were noted in assemblages of brick and mortar preheated at 1,000° C. The mechanical troweling machine gave a better indication of the workability of the mortars than did the time-of-set test. Observations made on the mortars heated in fusion blocks in general corroborated the observations made of the shrinkage, cracking, and fusion of the same mortars heated in brick piers. 16 p. 15c.

RP1462. Creep rates of cold-drawn nickel-copper alloy (monel metal). John A. Bennett and Dunlap J. McAdam, Jr.

A description is given of new equipment recently assembled at this Bureau for testing the creep of metals.

The apparatus was used to study the creep rate of cold-drawn nickel-copper alloy over a wide range of stress and temperature. Each specimen was used for a series of tests, which allowed a more rapid determination of the characteristic creep rates than using a single specimen for each test. The data indicate that the characteristic creep

rate depends only on the stress and temperature, and is not affected by prior stresses or temperatures. The influence of stress on the rate of creep increases with increasing stress, while the influence of temperature on the rate of creep decreases with increasing temperature. The results of the tests are shown in graphs, as no mathematical expression was found which would represent them. 21 p. 10c.

RP1463. Frictional properties of rubber. Frank L. Roth, Raymond L. Driscoll, and William L. Holt.

Laboratory measurements of coefficients of friction of soft rubber compounds were made by towing specimens on horizontal tracks and by allowing them to slide down inclined tracks. The specimens were prepared by attaching the rubber to a metal backing and molding it against glass surfaces having different degrees of roughness. The coefficients increase markedly with speed, ranging from about 1 at 10^{-4} cm/sec to more than 4 at 5 cm/sec. The occurrence of vibrations prevented observations at higher speeds. Static friction is greater than dynamic friction for speeds appreciably less than 10^{-3} cm/sec and less than dynamic friction for greater speeds. The coefficients decrease slightly with increasing pressures and are independent of the size of the specimen. Except at very low speeds the smoother surfaces yield the higher coefficients. Materials such as talc or bloom on the sliding surfaces cause large decreases in the coefficients.

Attention is called to the dependence of the coefficients of friction on the speed, which is shown in several previous investigations on rubber and other materials. 24 p. 10c.

RP1464. The first spectrum of antimony. William F. Meggers and Curtis J. Humphreys.

The spectrum emitted by neutral antimony atoms has been photographed, measured, and analyzed. Measured wavelengths and estimated relative intensities are given for 466 lines, ranging from 1388.91 to 12466.75 Å in wavelength and from 1 to 2500 in intensity. Nearly 80 percent of these lines are classified as combinations of 60 even energy levels arising from $5s^2 5p^2 ns$, $5s^2 5p^2 nd$, and $5s 5p^4$ electron configurations and 31 odd levels from $5s^2 5p^3$, $5s^2 5p^2 np$, and possibly $5s^2 5p^2 nf$. The average difference between observed and computed wave numbers is 0.15 cm^{-1} . A paucity of lines in the visible spectrum and intense radiation of antimony atoms in the ultraviolet and infrared are seen to be consequences of the relative values of various groups of levels. Although it is not possible to give a complete quantum interpretation of all the levels, several spectral series of the type $5s^2 5p^3 - 5s^2 5p^2 ns$ are proposed, and an absolute value of 69700 cm^{-1} is deduced for the ground state, $5s^2 5p^3, {}^4S_{3/2}$, of neutral antimony atoms. From spectroscopic data, the principal ionization potential of antimony is calculated to be 8.64 volts. 16 p. 5c.

RP1465. Structural changes in the bonding layer of soft-soldered joints in copper pipe lines on long-continued heating. William H. Swanger and Arthur R. Maupin.

In the course of previous investigations to establish the merits of soldered joints in copper-tube lines for domestic plumbing and other purposes, it became evident that in the evaluation of such joints consideration must be given to possible deterioration with time of the bond of the soldered joint if the service involves use at elevated temperatures. Joints made with solder containing tin were found to be susceptible to such a change, under favorable circumstances, whereas many lead-base solders were not. By means of metallographic studies of specimens cut from soldered joints held at elevated temperature for long periods, the nature of the microstructural change was established and correlated with the lowering of the bonding properties of the soldered joint. Essentially, this consists in the formation of a bonding layer adjacent to the copper base by alloying, by diffusion of the tin of the solder and the adjacent copper. Microhardness determinations showed this constituent to be much harder than the initial solder and also harder than the copper base. Evidence of brittleness was also found. Most tin-free lead-base solders, including lead-silver solder, were found not to be susceptible of this change. Lead-cadmium solder was an exception. 9 p. 10c.

RP1466. Electrical conduction in the glass insulation of resistance thermometers. Harold J. Hoge.

At temperatures above 350°C , electrical conduction may become troublesome in the glass through which the leads of certain types of resistance thermometers are sealed. It was found that conduction in these seals is rapidly reduced by polarization of the glass, and that the error in temperature measurement resulting from conduction in the glass may be considerably reduced by adopting a measuring schedule which takes full advantage of this polarization.

One type of glass was investigated under experimental conditions which prevented polarization. At 445° C this glass had a volume resistivity of approximately 21,000 ohm-cm. The temperature dependence of the resistance could be represented very roughly by $1/r = Ae^{-\epsilon/kT}$, with ϵ having a value of the order of 0.8 electron volt. 10 p. 5c.

RP1467. Tensile and compressive properties of some stainless-steel sheets. C. S. Aitchison, Walter Ramberg, L. B. Tuckerman, Herbert L. Whittemore.

Tensile and compressive tests were made on specimens from chromium-nickel (17-7 and 18-7) stainless-steel sheets, with cold-reductions from zero percent (annealed) to 50 percent, and thicknesses from 0.01 to 0.06 in. The tensile yield strengths ranged from 34 to 200 kips/in². The effect of a stress-relieving treatment at 300° C for 24 hours was investigated for one of the compositions.

The tensile tests were made on standard specimens. The compressive tests were made by the pack method developed at the National Bureau of Standards and by the cylinder method developed by Russell Franks of the Union Carbide & Carbon Research Laboratories. Tests were made on both longitudinal and transverse specimens from each sheet.

The results are given in tables and stress-strain curves to facilitate application in the design of light-weight structures from these materials. The effect of the degree of cold-reduction and of the stress-relieving treatment on the shape of the stress-strain curves and on the tensile and compressive properties is discussed. 69 p. 15c.

RP1468. Elimination of oxide films on ferrous materials by heating in vacuum. Vernon C. F. Holm.

An investigation of the mechanism by which lightly oxidized specimens of ferrous materials were brightened when heated in vacuum showed that the presence of carbon was essential. Oxidized specimens of iron containing small amounts of carbon were brightened in 15 to 20 minutes at 800° C and the elimination of the oxide film was accompanied by decreases in the carbon content. Cleanup of oxide films on stainless steel occurred also when the specimens were heated to about 1,050° C. Oxidized high-purity iron which contained less than 0.001 percent of carbon could not be brightened by vacuum heating at temperatures up to 1,250° C. Vacuum heating of lightly oxidized specimens of high-purity iron sometimes caused the oxide film to agglomerate, forming distinct, geometric patterns that could be observed under the microscope. 11 p. 10c.

RP1469. Measurements of ultraviolet solar- and sky-radiation intensities in high latitudes. W. W. Coblentz, F. R. Gracely, and R. Stair.

Data are given on the intensity of the biologically effective ultraviolet radiation, of wavelengths 3200 Å and shorter, from the sun and the entire sky, incident on a horizontal plane, under various meteorological conditions, in high latitudes. These data were secured by means of a photoelectric cell and automatic recording apparatus, whereby a continuous record of ultraviolet intensities, in absolute value, was obtained during the voyage of the Louise A. Boyd Arctic Expedition, up the west coast of Greenland to Etah (lat. 78.3° N) and down the coast of Baffin Land and Labrador.

The outstanding results of this survey are, that, for the same solar heights, in the highest latitudes visited (78° N) the ultraviolet intensities appear to be somewhat higher than in latitude 62° N, but somewhat lower than in latitude 39° N (Washington), in agreement with expectation, taking into consideration the distribution of ozone in the stratosphere with latitude and the season. In the highest latitudes, at the noon hour, on the clearest days, in mid-summer, the intensity of the ultraviolet solar and sky radiation ranged from 30 to 40 $\mu w/cm^2$, which is a significant value biologically, of especial interest to the medical profession in connection with the question of the incidence of rickets. 11 p. 10c.

RP1470. Rate of oxidation of typical nonferrous metals as determined by interference colors of oxide films. Dunlap J. McAdam, Jr. and Glenn W. Geil.

By means of interference colors the rates of oxidation were determined for 18 nonferrous metals and were compared with those for typical steels. The influence of temperature, oxidation time, and film thickness on the rate of oxidation is illustrated by projections of surface in three-dimensional diagrams. The diagrams for the nonferrous metals are similar to those for steels. For a constant film thickness, the relation between temperature and oxidation time is linear logarithmic. The variation of film thickness with either temperature or oxidation time, plotted logarithmically, is represented by a reversed curve. A discussion is given of the influence of the affinity of the metal for oxygen and of the rate of diffusion through the oxide film. The film

behaves as if the specific resistance varies nonlinearly with the film thickness. 43 p. 10c.

RP1471. Improved instrument for measuring the air permeability of fabrics. Herbert F. Schiefer and Paul M. Boyland.

This paper describes a new model of an instrument for the direct measurement of the air permeability of fabrics. The air, which is drawn through the fabric by a given suction, is measured with orifice-type flowmeters. The instrument is mounted in the top of a table and a new clamping device is provided, which permit measurements to be made rapidly on any part of a large piece of cloth without cutting.

The calibration and operation of the instrument are discussed. Results of measurements on two very different types of fabrics — parachute cloth and blankets — are given for several methods of clamping. A suitable method is described for which the edge leakage is negligible. The random sampling error of the average of 5 tests for air permeability is less than 5 percent, approximately 9 times out of 10. 6 p. 10c.

RP1472. Properties of high-purity iron. Harold E. Cleaves and John M. Hiegel.

Results are recorded of new determinations of the workability, microstructure, density, and the thermal, mechanical, electrical, and magnetic properties of high-purity iron, in which the maximum amount of an individual impurity was 0.004 percent and the total of impurities in any specimen was 0.01 percent or less. 25 p. 10c.

RP1473. Perforated cover plates for steel columns: Program and test methods. Ambrose H. Stang and Martin Greenspan.

Tests were made to determine the mechanical properties of perforated cover plates intended to be used as a substitute for lattice bars or batten plates in built-up box-type columns. Each test column was built up from one perforated plate and either two or four angles. Columns with unperforated plates were used as controls.

In this paper the program is outlined and the methods of test are described. The results of the tests and the conclusions will be presented in subsequent papers. 18 p. 10c.

RP1474. Perforated cover plates for steel columns: Compressive properties of plates having ovaloid perforations and a width-to-thickness ratio of 40. Ambrose H. Stang and Martin Greenspan.

Tests were made to determine the mechanical properties of perforated cover plates intended to be used as a substitute for lattice bars or batten plates in built-up box-type columns. Each test column was built up from one perforated plate and either two or four angles. Columns with unperforated plates were used as controls.

This paper gives the results of the tests on columns having plates of three different perforation spacings.

It was found that the perforated plates contributed to the strength, and especially to the stiffness, of the columns, and that the factor of stress concentration, due to the presence of the perforations, varied from 2 to 2.5 based on the gross area (1.8 to 2.1 based on the net area). 26 p. 10c.

RP1475. Effect of altitude on knock rating in CFR engines. Donald B. Brooks.

Knock ratings made at altitude have shown systematic differences from ratings made at sea level, on some fuel types. Altitude-chamber tests showed that complete agreement could be obtained if tests were made at uniform knock intensity, and that uniform knock intensity was obtained when the cylinder clearance volume was reduced in linear relation to air pressure. From these tests, equations are developed to relate clearance volume for standard knock intensity to air pressure and to octane number for the ASTM Motor and the CFR Research Methods of knock rating. Equations are also developed to relate octane-number requirement to air pressure, and these are shown to agree with road-test data. 22 p. 10c.

RP1476. Weather resistance of porcelain-enameled iron structural units. William N. Harrison and Dwight G. Moore.

A study of the weathering resistance of vitreous enameled architectural panels was begun by the National Bureau of Standards in 1939. The study involves 864 one-foot-square panels, representing 14 types of enamel and a like number of 4- by 6-in. laboratory specimens. At the end of the first year of exposure at four locations selected for different climatic conditions, over half of the panels showed no visible weathering effect, and in no case did weathering produce any failure of the enamel to protect the underlying metal from rusting.

The full-mat enamels were found unsuited for architectural use where appearance is important, because of fading and of difficulty in cleaning. Mild fading, found on

some of the non-acid-resistant colored enamels, was associated with a minute pitting of the enamel surface, probably caused by the presence of acid-forming gases in the atmosphere. The enamels of high acid resistance did not show this effect.

Weathering of the panels was found to be more pronounced at those locations where there is a relatively high concentration of combustion gases, and less severe where there is a practical absence of these gases in the atmosphere. An accelerated weathering test is described, which gives an effect closely resembling the most important form of actual weathering. 20 p. 10c.

RP1477. Relief of residual stress in streamline tierods. Rolla E. Pollard and Fred M. Reinhart.

About two-thirds of the residual stress in cold-worked SAE 1050 steel tierods was relieved by heating them 30 minutes at 600° F. Cold-worked austenitic stainless steel tierods could be heated at temperatures up to 1,000° F without lowering the important physical properties. With materials of straight 18-8 composition, however, the limiting heating temperature was found to be about 900° F, because at higher temperatures precipitation of chromium carbide occurred. It is possible that materials containing additions of titanium, columbium, or molybdenum could be heated at higher temperatures, since the carbides of these elements would be precipitated in preference to chromium carbide.

Microscopic examination and Vickers indentation tests indicated localized differences in the amount of cold-working. Such differences may explain the distribution of residual stress in cold-worked tierods. 18 p. 10c.

RP1478. Measurement of the fading rate of paints. Arnold J. Eickhoff and Richard S. Hunter.

Ability to resist fading is a valued property of most paint and textile materials, and therefore improved methods for measuring the course of fading are in demand. Two of the important evidences of the fading of paints, namely change of color and change of gloss, can be measured rapidly by photoelectric methods developed within the past few years. In the present study photoelectric tristimulus measurements of color change and photoelectric measurements of specular-gloss change were used to follow the fading of several paint samples exposed both to outdoor weather and to two machine treatments (*A* and *B*) designed to weather the samples at an accelerated rate. With these measurements it was possible to compare numerically the rates of artificial and natural fading of the paints. The data which were obtained show: (1) the treatment used in conjunction with apparatus *A* caused fading which averaged 20 times as fast as fading outdoors, but the speed-up factor varied from roughly 5 times for one paint to roughly 40 times for another; (2) the treatment used in conjunction with apparatus *B* caused fading which averaged 5 times as fast as fading outdoors, but the speed-up factor varied from roughly 3 times for one paint to roughly 20 times for another; and (3) for almost every paint tested the factor relating the speed of fading from treatment in apparatus *A* to the speed outdoors was more nearly constant through the whole fading process than the corresponding factor for treatment in apparatus *B*. Thus treatment *A* not only faded paints faster, but it provided a preview of the course of fading which was usually a better representation of outdoor fading than that provided by treatment *B*. The data collected during the present study are noteworthy chiefly for the methods they demonstrate. These should be valuable for future studies of the fading of materials and for the examination of methods for accelerating fading. 21 p.

RP1479. Determination of carbon and hydrogen in bone black and other chars. Victor R. Deitz and Leland F. Gleysteen.

The carbon and hydrogen contents of samples of bone chars, charcoals, and vegetable carbons are determined by combustion in oxygen, the resultant carbon dioxide and water being weighed. The procedure for the handling of such highly adsorptive substances is set forth with a description of the necessary apparatus.

A simple procedure is adopted to bring each sample for analysis to a constant weight. This consists in exposure of the sample to air saturated with water in an exsiccator for 18 hours, and subsequent heating in a helium atmosphere at 105° C for 18 hours. In the determination of the carbon, corrections are made for the carbonate remaining in the ash from the combustion and for the carbonate and the adsorbed carbon dioxide contained in the original sample.

The results are tabulated to give these separate contributions to the total carbon. A comparison is made with the results for the same materials obtained by the deter-

mination of the loss upon ignition of the acid-washed residue of each sample. 11 p. 5c.

Title page and contents for volume 28. 6 p. 5c.

RESEARCH PAPERS FROM JOURNAL OF RESEARCH OF THE NATIONAL BUREAU OF
STANDARDS, VOLUME 29, JULY—DECEMBER 1942

RP1480. A new determination of the constant of gravitation. Paul R. Heyl and Peter Chrzanowski.

A new determination of the constant of gravitation by means of the torsion balance has been made in the hope of improving the precision of the result published in 1930. A number of suggested improvements in the apparatus were tried, and two of these were adopted. The result obtained shows so slight an improvement over the 1930 result that it appears that the limiting point of diminishing returns has been reached with this form of apparatus. 31 p. 10c.

RP1481. Influence of initial structure and rate of heating on the austenitic grain size of 0.5-percent-carbon steels and iron-carbon alloy. Thomas G. Digges and Samuel J. Rosenberg.

Tests were made to determine the influence of variations in initial structure and rate of heating through the transformation temperature range on the grain sizes at 1,475° and 1,600° F of a high-purity alloy of iron and carbon and two commercial steels each containing 0.5 percent of carbon. Variations in initial structure had no effect on the grain size of the iron-carbon alloy. Although the initial structure had some influence on the grain size of the steels, no correlation was found between the grain size and the spacing of pearlite or the form and distribution of the carbides. The rate of heating had a pronounced effect on the grain size of the iron-carbon alloy, and in some cases the rate of heating also influenced the grain size of the steels. However, the trend in the steels was the reverse of that of the iron-carbon alloy in that the finest grains were obtained in the steels with slow rates of heating. 8 p. 15c.

RP1482. Microscopic structure of flax and related bast fibers. Charles W. Hock.

The microscopic structure of flax and of related bast fibers was investigated. The stem of the flax plant consists of two main parts, a central woody core, and a surrounding cortex which contains the bast fibers. The cambium layer lies between these regions. Retting involves, essentially, a softening of the tissues to permit separation of the fibers from the other parts of the stem. The cambium layer is attacked first during this treatment, followed later by attack on other thin-walled cells in the cortex.

Flax and related bast fibers, such as hemp, jute, and ramie, have a similar origin and structure. They are obtained from the stem in the form of long filaments, each of which is made up of cells. In this respect they differ from cotton fibers, which are single plant cells.

A flax cell has a primary and a secondary wall. The former constitutes the surface of each cell and consists largely of wax and other material, much of which has generally been assumed to be of a pectic nature. The secondary wall, which comprises the bulk of the fiber, is made up of innumerable cellulose fibrils, the outermost layer of which winds in one direction, whereas the majority of the fibrils beneath this layer wind in the opposite direction. These fibrils are grouped so as to give the wall a lamellar pattern. There is a greater number of these layers in the walls of the cells at the base of the stem than in the cells from the growing tip. A corresponding increase in thickness of the wall, from the tip of the stem where the cells originate to the base where they mature, also prevails. All the bast fibers have essentially similar structures. Flax and ramie, however, differ from hemp and jute in the directions of fibrillate orientation, and this accounts for some of the differences in the physical properties of the two groups. 10 p. 10c.

RP1483. Accelerated aging of lace leathers. Joseph R. Kanagy and Philip E. Tobias.

Alum-, indian-, and chrome-tanned lace leathers, submitted by various manufacturers, were tested for deterioration under accelerated-aging conditions. In addition, the physical and chemical properties of these leathers were determined according to the tests prescribed by the Federal specification for lace leathers. The alum-tanned lace leathers were much less stable under the conditions of accelerated aging than the indian- and chrome-tanned leathers. Several types of chrome-tanned leathers, including chrome-tanned lace leather, showed intermediate stability. From the results of these tests, it appears that measurements of physical properties, such as strength, stretch, and flexibility, together with an accelerated-aging test, may be expected to give more valuable information about the performance characteristics of lace leathers than the measurements required by the present Federal specification. 6 p. 5c.

RP1484. Effect of moderate cold-rolling on the hardness of the surface layer of 0.34-percent-carbon steel plates. Harry K. Herschman.

The influence of moderate cold-rolling on the surface indentation hardness of 0.34-percent-carbon steel plate initially surface-finished by three different methods was investigated. Variations of the hardness of the surface layers extending to different depths below the surface of the specimens were determined by applying different loads on a Knoop indenter. Indentation hardness tests also were made with the Rockwell Superficial hardness machine. The results obtained with the Knoop indenter showed significantly lower hardness numbers for the superficial layer of the steel after the lighter degrees of rolling, the magnitude of change apparently being influenced by the mode of initial finishing. Hardness decreases were not revealed by tests made with the Rockwell Superficial machine nor in any case in which the penetration of the Knoop indenter exceeded about 0.0003 inch. 11 p. 10c.

RP1485. Note on flexural fatigue of textiles. Herbert F. Schiefer and Paul M. Boyland.

Results are given which indicate that the ability of a textile fabric to withstand repeated flexing depends upon the structure of the fabric, the position and structure of the yarn in the fabric, and the kind of fiber from which the fabric is made. 3 p. 10c.

RP1486. Elasticity of wool as related to its chemical structure. Milton Harris, Louis R. Mizell, and Lyman Fourt.

Wool protein, like other fibrous proteins, is composed of long, flexible molecular chains. This flexibility appears to be the basis of the "long-range" elasticity of wool fibers. The wool fiber is distinguished from other textile fibers by the presence of covalent disulfide cross-links between these main chains. Rupture of these links by chemical means decreases the strength of the fiber without necessarily affecting the elastic recovery. Rebuilding the covalent linkages largely restores the original properties of the fiber.

Wool appears to be analogous to rubber in several respects. Thus the stress-strain, solubility, and swelling characteristics are greatly influenced by the extent of cross-linking in the two materials. 14 p. 5c.

RP1487. Specific heat of the synthetic rubber Hycar O. R. from 15° to 340° K. Norman Bekkedahl and Russell B. Scott.

Measurements of specific heat were made on a sample of Hycar O. R. synthetic rubber from 15° to 340° K by means of an adiabatic vacuum-type calorimeter. The experimental values of the specific heat between 15° and 22° K were well represented by the Debye specific-heat equation, using a βv value of 80, and accordingly the values below 15° K were calculated with this equation. At about 250° K the material has a transition of the second order, the specific heat increasing by about 40 percent to a value of 1.84 int. joule-gram⁻¹-degree⁻¹ just above the transition. From 250° to 340° K the specific heat-temperature curve is nearly linear, and the values can be calculated to within 0.2 percent from the formula $C_p = 0.00283T + 1.126$, in int. joules-gram⁻¹-degree⁻¹. At 298.16° K (25° C) the specific heat is 1.971 int. joules-gram⁻¹-degree⁻¹ (0.4712 calories-gram⁻¹-degree⁻¹). The increase in entropy resulting from heating from 0° to 298.16° K was calculated to be 1.743 ± 0.002 int. joules-gram⁻¹-degree⁻¹ (0.4167 ± 0.0005 calories-gram⁻¹-degree⁻¹). 9 p. 5c.

RP1488. Equation of motion for the steady mean flow of water in open channels. Garbis H. Keulegan.

There is disagreement in the literature regarding the use of the Coriolis and the Boussinesq velocity-distribution coefficients in the open-channel flow equation. It is shown in this paper that the use of either coefficient is correct, provided the terms representing the effects of resistance are properly interpreted. The methods of deriving the two forms of the flow equation are given in detail, and it is shown that in the form of equation containing the Boussinesq coefficient, the friction coefficient is related directly to the wall friction. In the form of equation containing the Coriolis coefficient, the friction coefficient is related to the rate of energy loss in the water. This has a direct bearing on the correct use of Manning's "n" in the equation of flow in open channels. 15 p. 10c.

RP1489. Metallographic study of the formation of austenite from aggregates of ferrite and cementite in an iron-carbon alloy of 0.5 percent carbon. Thomas G. Digges and Samuel J. Rosenberg.

The formation of austenite on heating aggregates of ferrite and cementite in a high-purity alloy of iron and carbon (0.50 percent carbon) is described. In fine pearlite,

austenite was preferentially nucleated at the interfaces of ferrite and carbide at the boundaries of pearlite colonies and proeutectoid ferrite or at the boundaries between pearlite colonies, although it occasionally formed within the colonies. In spheroidized structures, nucleation occurred at ferrite-carbide interfaces at the cementite network or at isolated cementite particles. Austenite formed at numerous interfaces, so that in the initial stages it was always *fine-grained*. However, if the rate of heating is slow, rapid grain growth takes place in the Ac^1 - Ac^3 temperature range. The predominant factor in establishing the austenite grain size in this alloy was the rate of growth and not the rate of nucleation. 9 p. 10c.

RP1490. Fractionation of cellulose acetate. Arnold M. Sookne, Henry A. Rutherford, H. Mark, and Milton Harris.

By means of a series of three successive fractional precipitations, a solution containing 2 kg of commercial cellulose acetate was separated into 15 fractions varying in degree of polymerization from 30 to 380. The procedure involved the fractional precipitation of the acetate from a solution in acetone, using ethyl alcohol as the precipitant.

From the viscometrically estimated chain-lengths of the fractions, the distribution of chain-lengths in the starting material (excepting the first fraction) was obtained. The first fraction was not completely soluble in acetone or Methyl Cellosolve, and therefore no estimate of its degree of polymerization was obtained. It was shown that a large proportion of the ash and haze-producing materials are contained in this first fraction. All of the other fractions have very low ash contents, and with the exception of the fractions of very low degrees of polymerization, the acetyl contents are constant. A phase diagram showing some of the solubility relationships of the starting material and several of the fractions is given. 8 p. 5c.

RP1491. Oxidation of cellulose: the reaction of cellulose with periodic acid. Henry A. Rutherford, Francis W. Minor, Albert R. Martin, and Milton Harris.

An investigation has been made of the mode of attack of cellulose by periodic acid during the early stages of the oxidation (that is, oxidation of approximately 1 percent of the glucose residues). Under these conditions, it is shown that the reaction is confined to oxidation of the secondary hydroxyl groups to aldehyde groups, and results in a rupture in the carbon chain between carbon atoms 2 and 3 of the glucose unit. In accordance with this mechanism it is shown that two moles of aldehyde groups are produced for each mole of oxidant consumed. The aldehyde groups of the periodic acid-oxycellulose can readily be converted to carboxyl groups, titration of which provides an independent check on the content of the former.

Periodic acid-oxycellulose is characterized by its susceptibility to further attack by alkaline solutions. The alkali-sensitivity of these materials, as measured by solubility in hot dilute sodium hydroxide and by cuprammonium fluidity, appears to be proportional to the content of aldehyde groups. However, upon conversion of all of the aldehyde groups to carboxyl groups, the alkali-lability practically disappears. The results suggest that the sensitivity of periodic acid-oxycellulose to alkali does not depend solely on the rupture of the glucose ring between carbon atoms 2 and 3, but is related to the specific instability toward alkali of the dialdehyde formed during the oxidation. 11 p. 5c.

RP1492. A flow manostat for various purposes, including the candy test. Max J. Proffitt.

The flow manostat described in this paper is virtually a sensitive pressure-reducer in which the valve unit consists of a knife-edged circular orifice which is converted into an annular opening by means of a coaxial tapered core that floats upon a liquid surface which is depressed through contact with the gas at the regulated reduced pressure. Any change in the regulated pressure produces an axial movement of the core, thus expanding or contracting the area of the annular opening by an amount which is just sufficient to compensate approximately the effects of the change in the service pressure that induced the change in the regulated pressure. To minimize friction, the major diameter of the spindle or tapered part of the core is made slightly less than the diameter of the orifice. This allows the spindle to move its full length through the orifice without touching the edges of the orifice. Each valve unit has only a short range of variability in throughput capacity. Any reasonable capacity outside of this range can be obtained by substituting a valve unit of appropriate size in the same manostat. Each valve unit comprises an orifice plate with knife-edged opening (or else a pair of such plates), together with a properly fitting core having one spindle or two as required. The volume of flow always is governed by the discharge characteristics of the nozzle or fixed group of simultaneously operating nozzles served by the manostat. Any change in these characteristics will involve readjustment of the regulated pressure.

An experimental manostat equipped with a double, self-balancing valve unit conforming approximately with this design reduced a gas service pressure varying between the limits of 104 and 164 mm of water to a regulated pressure of 49.6 ± 0.5 mm of water, while serving three burners consuming a total of about 8 cubic feet of gas per hour. 13 p. 10c.

RP1493. An equation for the isotherms of pure substances at their critical temperatures. Cyril H. Meyers.

An empirical equation is presented for data along the isotherms of pure substances at their critical temperatures and densities up to 1.1 times the critical density. The equation has five constants in addition to the universal gas constant. Of these five one is limited to a single value, if a simple solution to the equation is to be obtained; three are determined by the critical conditions; and the remaining constant is determined empirically from data other than those for the critical state. Three of the five constants are independent of the substance, one is an explicit function of RT_c/p_cV_c , whereas the reciprocal of the fifth is found to be practically a linear function of RT_c/p_cV_c for values of that ratio up to 3.8 or 3.9. This relation correlates the isotherms for various substances, so that data on two well-chosen substances, such as hydrogen and carbon dioxide, suffice to determine the fifth constant and consequently the critical isotherm for other substances, for which RT_c/p_cV_c is not greater than 3.8. For substances such as ammonia (for which RT_c/p_cV_c is 4.08), the fifth constant may not conform to the linear relation.

The equation represents the data for 12 of 13 substances within the experimental error, the exceptional substance being water (for which RT_c/p_cV_c is 4.34).

At low densities the equation reduces to a simpler form which expresses pV/RT as a quadratic function of density.

The fugacity along the critical isotherm can be calculated from the equation. The fugacity at the critical state is approximately two-thirds the critical pressure for all substances. The fugacity of CO_2 is calculated at 1 atmosphere and at the critical pressure. 20 p. 10c.

RP1494. X-ray measurement of the thickness of the cold-worked surface layer resulting from metallographic polishing. Herbert C. Vacher.

Different thicknesses of cold-worked layers, each representative of a specific abrasive treatment used in metallographic polishing, were produced on annealed specimens of steel (0.34% C), copper, and aluminum. The back-reflection patterns of the specimens showed a progressive increase in the degree of diffuseness with thickness in the range from 2 to 25 microns on the steel specimens, 2 to 42 microns on the copper specimens, and 5 to 95 microns on the aluminum specimens. A comparison of these patterns with others obtained from copper and steel specimens indicated that the cold-worked layers produced by certain fine-abrasive treatments were thicker than those produced by certain coarse-abrasive treatments. 5 p. 10c.

RP1495. Provisional pH values for certain standard buffer solutions. Roger G. Bates, Walter J. Hamer, George G. Manov, and S. F. Acree.

For use in the calibration of electrometric pH assemblies, 17 standard buffer solutions have been investigated, and pH values at 20°, 25°, and 30° C have been assigned to them. The pH values of these solutions range from 2.27 to 11.68 and are considered accurate to ± 0.02 pH unit.

Hydrogen-silver-chloride cells without liquid junctions were used for establishing the precise pH values of the buffer mixtures. The assumptions made to determine the activity coefficients of the ions in the mixtures are discussed. The method of assigning an accurate pH value to a buffer mixture is outlined.

Directions for preparing the mixtures from purified anhydrous salts, standard solutions of acid and alkali, and pure water are given. Changes of temperature have a large effect on the pH values of the buffers of pH greater than 7 than on those of the acid buffers. In all cases the effect of dilution is small; an error of 1 percent in the volume of solvent added results in a change of less than 0.001 pH unit.

The use of a pH meter of the glass-electrode-calomel-electrode type calibrated by means of a standard buffer may often involve greater uncertainties than those inherent in the pH value assigned to the buffer mixture. It should be recognized that errors arising from liquid junction, hysteresis, temperature, and salt effects may combine to give an uncertainty of 0.01 and 0.03 unit or more in practical pH tests. 8 p.

RP1496. Surface available to nitrogen on bone black and other carbonaceous adsorbents. Victor R. Deitz and Leland F. Gleysteen.

The adsorption of nitrogen was determined at liquid nitrogen and liquid oxygen temperatures by measuring the pressure decrease of a known volume of the gas

exposed to each of 20 different samples of bone blacks, activated carbons, vegetable carbons, and coconut charcoals. Typical adsorption isotherms of these data are illustrated. Specific surfaces were estimated with fair accuracy from an analysis of the data with the aid of the multimolecular theory of adsorption. The surfaces of new bone chars, service bone chars, and spent bone chars are compared; the ratio of the specific surface of a new char to that of a spent char may be as great as 7. The distribution of pore sizes in the adsorbents is discussed and the data are divided into five groups, each characterized by a value of n , which is defined as the maximum number of adsorbed layers possible on the surface of the material. All the samples in each group have a common isotherm when reduced to unit surface. The differential heats of adsorption are also determined from the data. The adsorption at 77°K is also considered from the standpoint of capillary condensation. The volume, as adsorbed liquid nitrogen, is plotted against the corresponding radius of a cylindrical capillary, which is determined from the Kelvin equation. 35 p. 10c.

RP1497. Preparation of lower aldonic acids by oxidation of sugars in alkaline solution. Horace S. Isbell.

Directions are given for the preparation of *l*-erythronic, *d*-threonic, *d*-lyxonic, *l*-zylonic, and *d*-arabonic acids by means of oxidation with oxygen of certain sugars in alkaline solution. *d*-Arabonic acid was obtained in about 70-percent yield, in agreement with the results of prior investigators. Lower yields were obtained for other aldonic acids, and they do not differ greatly from those obtained by oxidation with air. Nevertheless, the simplicity of the method makes it suitable for the production of lower aldonic acids by persons requiring a supply of these scarce materials. *l*-Erythronic and *d*-threonic acids were separated in the form of brucine salts, the optical rotations of which were found to be represented by the following expressions: $[\alpha]^{20}_D = -28.4 - 0.85C + 0.025C^2$, in which C is the grams of anhydrous brucine *d*-erythronate in 100 ml of aqueous solution; $[\alpha]^{20}_D = -28.5 - 0.9C + 0.025C^2$, in which C is the grams of anhydrous brucine *d*-threonate in 100 ml of aqueous solution. 6 p. 5c.

RP1498. Characteristics of wide-angle airplane-camera lenses. Francis E. Washer.

The relative illumination in the focal plane was measured for a number of wide-angle airplane-camera lenses, using a method depending upon the determination of the light-transmitting area of the lens effective at definite orientations of the lens. A new factor dependent on the lens design was found to be operative in reducing the values of the relative illumination in the unvignetted portion of the field for certain types of lenses. Determinations of the resolving power were also made and showed considerable variation in performance with type of lens. The effect of basing the distortion values upon the calibrated focal length instead of the equivalent focal length was determined. 14 p. 5c.

RP1499. Heat of combustion of benzoic acid, with special reference to the standardization of bomb calorimeters. Ralph S. Jessup.

New measurements yielded the value 26428.4 ± 2.6 international joules per gram mass for the heat of combustion, Q_B , of benzoic acid at 25° C under the conditions of the standard bomb process. The difference, 0.036 percent, between the above value and that reported in 1934 is due to five factors: (1) An error in the previous value, resulting from the effect of dissolved carbon dioxide on the determination of the nitric acid formed in the bomb, (2) a change in the value used for the energy of formation of nitric acid in the bomb, (3) taking account in the present work (in the calculation of the value of Q_B at 25° from the observed value at 30°) of the temperature dependence of the Washburn reduction, (4) a change in the value used for the temperature coefficient of heat of combustion, arising from the use of a new value for the specific heat of benzoic acid, and (5) a small difference in the results of the calorimetric measurements. The 1934 results, when corrected for the first four of the above effects, are in agreement within 0.01 percent with the results of the present measurements. The procedure for correcting the results of calibration experiments originally calculated on the basis of the 1934 value of Q_B is described.

With one exception, values of Q_B at 25° C calculated from the results of previous measurements are in satisfactory agreement with the value given above.

When the amount of benzoic acid burned in each experiment was calculated from the mass of carbon dioxide formed, the present measurements yield the value 3226.39 ± 0.32 international kilojoules per mole for $-\Delta H^\circ_{298.16}$, the decrease in heat content for the combustion reaction at 25° C when each of the gases involved in the reaction is in the thermodynamic state of the unit fugacity and the water formed in combustion is in the liquid state. 24 p. 10c.

RP1500. Dependence of the indigestibility of wool protein upon its polymeric structure. Walton B. Geiger and Milton Harris.

The resistance of wool to digestion by enzymes is probably due to a unique structure, consisting of peptide chains joined by disulfide cross-links to form a three-dimensional polymeric network of extremely high molecular weight. This conclusion is substantiated by a study of a series of derived wool proteins similar in composition but expected to differ in molecular weight. The proteins were prepared by first "depolymerizing" wool by reducing its disulfide cross-links to sulfhydryl groups, then making a series of solutions of this protein of widely varying concentration, and finally rebuilding the disulfide cross-links by reoxidation.

An investigation of the rates of digestion by pepsin of a series of such proteins showed that those preparations expected to be of low molecular weight were rapidly digested, whereas those expected to be of greatest molecular weight were almost as resistant to digestion as untreated wool. 7 p. 5c.

RP1501. Perforated cover plates for steel columns: Compressive properties of plates having ovaloid perforations and a width-to-thickness ratio of 68. Ambrose H. Stang and Martin Greenspan.

Tests were made to determine the mechanical properties of perforated cover plates intended to be used as a substitute for lattice bars or batten plates in built-up box-type columns. Each column was built up from one perforated plate and either two or four angles. Columns with unperforated plates were used as controls.

This paper gives the results of the tests on columns having plates of three different perforation spacings. The plates had ovaloid perforations and a width-to-thickness ratio of 68.

It was found that the perforated plates contributed to the strength and to the stiffness of the columns. The factor of stress concentration, due to the perforations, varied from 2 to 2.6 based on the gross area (1.7 to 2.1 based on the net area). 24 p. 10c.

RP1502. A reexamination of the Potsdam absolute determination of gravity. Hugh L. Dryden.

Recent absolute determinations of the acceleration of gravity differ from the generally accepted Potsdam value by amounts considerably greater than the probable error assigned to that value by the Potsdam investigators. The discrepancy is due in large part to an adjustment made with the intent of correcting for certain systematic errors. The adjustment was probably not warranted. If this adjustment is not made, the Potsdam result is about 12 parts per million less than the commonly accepted value as compared with 14 and 20 parts per million less as found in the recent absolute determinations. The best value of g for general use when accurate absolute values are needed is probably obtained by reducing the local value in the Potsdam system by about 15 parts per million. The Subcommittee on Gravity of the National Research Council Committee on Fundamental Physical Constants has recommended a reduction of 17 parts per million. 12 p. 5c.

RP1503. Catalyzed hydrolysis of amide and peptide bonds in proteins. Jacinto Steinhardt and Charles H. Fugitt.

The rates of hydrolysis by dilute acids of both a dissolved protein (egg albumin) and an insoluble protein (wool) are shown to depend not only on the temperature and acidity but also on the acid used. When hydrolyzed at 65° C by certain strong monobasic acids of high molecular weight, the amide and the peptide bonds are broken over 100 times as fast as when they are hydrolyzed with hydrochloric acid. Even among the common mineral acids, large differences appear. These differences in hydrolytic effectiveness parallel differences in the affinities of the anions of the acids for protein. A further reason for attributing this effect to the anions is the attainment, with anions of high affinity, of a maximum rate of amide hydrolysis at relatively low concentrations, stoichiometrically equivalent to the sum of the amino plus the amide groups. A similar limiting anion concentration or maximum rate of hydrolysis of the much more numerous peptide groups is not observed. On the basis of details of the dependence of the rate of hydrolysis on concentration of effective anions and hydrogen ions, a mechanism which involves combination of the groups hydrolyzed with hydrogen ions, is proposed.

At low concentrations of effective anions, amide hydrolysis is catalyzed more strongly than peptide hydrolysis. By keeping the concentration slightly below stoichiometric equivalence to the sum of the amino plus amide groups the amide groups may be rapidly hydrolyzed without extensive hydrolysis of the peptide bonds in the protein. Practical applications are suggested. 13 p. 5c.

RP1504. Fresnel reflection of diffusely incident light. Deane B. Judd.

The reflection factor of a plane boundary between two media has been computed by the Fresnel formula for unpolarized, perfectly diffused incident light as a function of the relative index of refraction of the media. Because of total internal reflection, the factors depend importantly upon whether the diffuse flux is incident externally or internally. For example, diffuse light in air incident on the plane surface of glass of index 1.5 is 9.2 percent reflected; but if the perfectly diffuse light is incident internally, the reflection factor is 60 percent. 4 p. 5c.

RP1505. Wear testing of carpets. Herbert F. Schiefer.

The NBS and Shawmut machines for testing the wear resistance of carpets, a gage for measuring the thickness of carpets, and an instrument for measuring the length of a tuft of pile from a carpet are described. The effects of the height of the vacuum-cleaner nozzle above the pile, the amount of suction at the nozzle, and the relative humidity and temperature of the air in which the test is made, on the results obtained with the NBS machine were studied. The effect of systematic changes in carpet construction on the wear resistance was investigated with each machine and under severe service conditions. Tests on 24 carpets of Axminster, velvet, and Wilton weaves were made on the two types of machines in several laboratories, and the results obtained in the different laboratories were correlated with each other and also with the results of 3 years of service tests on the same carpets. The correlations were highly significant, but large systematic differences between the weaves and between the laboratories were obtained. The latter difference is attributed primarily to a lack of uniformity in the testing procedures. Three types of vacuum-cleaning systems were used during the service tests, and their effect on the wear of the carpets and the effectiveness of cleaning were observed. The *S* index, which is the time required to wear the pile of a carpet down to one-fourth of the matted pile thickness, corresponds closely with the time at which a carpet in a service test would be discarded on account of visible wear. The deviation of the *S* index of a single test from the average is less than 10 percent in 9 trials out of 10. The nature of the wear produced by the two machines on the pile fibers was found to be similar to that produced during the service tests. The analysis of carpets do not yield sufficient data to determine the probable durability of carpets in general. The relative wear of carpets for a given use can be evaluated by means of laboratory wear tests. For general interlaboratory comparison of the relative wear resistance of carpets, the testing machines and the testing procedures must be rigidly standardized and controlled. 47 p. 20c.

RP1506. Chemically modified wools of enhanced stability. Walton B. Geiger, F. F. Kobayashi, and Milton Harris.

Recent work at this Bureau has shown that the disulfide cross-linkages of wool can be transformed to more stable bis-thioether linkages by a two-step process. The disulfide groups are first reduced to sulhydryl groups by means of a mercaptan, and then, by treating the wool with an aliphatic dihalide, pairs of sulfur atoms are linked together through short hydrocarbon chains. Wools modified by such a process have now been studied more extensively. It was found that they are decidedly more stable than untreated wool toward many chemical agents, including alkalis, acids, oxidizing agents, and reducing agents; are stained less easily by metals; and are attacked much less readily by certain biological agents, including moths, carpet beetles, and enzymes. 9 p. 10c.

RP1507. Measurement of densities of synthetic rubbers. Lawrence A. Wood, Norman Bekkedahl, and Frank L. Roth.

A method has been developed for preparing specimens of synthetic rubber in a form suitable for precise measurements of the density. The rubber is outgassed in a vacuum chamber, and while still under vacuum is molded into a sheet about $\frac{1}{16}$ in. (1.6 mm) thick. Specimens weighing between 1 and 2 g each are cut from this sheet and are employed for the measurement of the density by the method of hydrostatic weighings. The values obtained with different specimens from the same sample rarely differ from each other by more than 0.05 percent. Measurements are made soon after molding because some rubbers recover, and develop roughened surfaces and vacuoles which bring about a decrease in the apparent density.

Unvulcanized Buna S, prepared in a laboratory polymerization with a minimum quantity of materials other than butadiene and styrene, was found to have a density of 25° C of 0.9291 g/cm³. Corresponding values for butadiene-styrene copolymers produced on a commercial scale are as follows: Firestone Buna S, 0.9358; U. S. Rubber Co. Buna S, 0.9369; Standard Oil Co. (N. J.) Buna S, 0.9390; Chemigum IV, 0.9391; Hycar O. S.-20, 0.9385; and Hycar O. S.-30, 0.9303 g/cm³. The densities of other common varieties of synthetic rubber were found to be as follows: Neoprene

CG, 1.2307; Neoprene E, 1.2384; Neoprene FR, 1.1406; Neoprene GN, 1.2290; Chemigum I, 1.0135; Hycar O. R., 0.9992; Perbunan, 0.9684; Thiokol RD, 1.0564; Thiokol A, 1.5983; Thiokol FA, 1.3298; and Butyl B-1.45, 0.9175 g/cm³. 6 p. 5c.

RP1508. Ten-year tests of high-early-strength cement concretes. Louis Schuman.

Data on 10-year compressive strengths of concrete cylinders made from 12 commercial high-early-strength cements are given, supplementing the results up to 1 year given in Research Paper 799. When cured in moist air, the concretes generally continued to gain strength between 1 and 10 years. For concretes stored in the air of the laboratory, the 10-year strengths are approximately equal to those at 28 days. Comparisons are given between strengths of concretes made in 1910, 1930, and 1941, showing that concretes made with some present-day cement may attain strengths in 1 month exceeding those for the older cements at 10 years. 7 p. 5c.

RP1509. Interval selector for random pulses. Francis J. Davis and Leon F. Curtiss.

An interval selector is described which has been developed to study the distribution of pulses from Geiger-Müller counters. The circuit is designed to count pulses with a separation less than τ , where τ may be varied between 3×10^{-3} sec and 0.2 sec. Tests are described which show that the circuit accomplishes these measurements with considerable precision.

Results of tests on alcohol-vapor-argon and amyl-acetate-vapor-argon-type Geiger-Müller counters are given which show that counters of this type can be prepared in a simple manner, yielding the proper random distribution of pulses even at very rapid rates of counting. Counters thus prepared have maintained their characteristics for at least 2 years. 11 p. 5c.

RP1510. Combination of wool protein with acids in mixtures, and its relation to the acid dyeing of wool. Jacinto Steinhardt, Charles H. Fugitt, and Milton Harris.

In order to extend previously reported analyses of the combination of acids with wool, measurements have been made over a wide range of concentrations, of the amounts of the anions of two acids combined by wool fibers when acids of different affinity for protein are present in different proportions or in mixtures of their acid and salt forms. It is shown that anions compete with one another for combination with the fiber, so that the amounts of each combined depend not only on the amounts initially present but also on their respective affinities for wool. The bearing of these results and their interpretation on the theory of acid dyeing is discussed, with special reference to the factors promoting the attainment of "level" or "solid" application of dye to the fibers. 8 p. 5c.

RP1511. Analysis of the selective combination of wool with acids in mixtures. Jacinto Steinhardt.

Wool immersed in mixtures of two strong acids, or of one acid and a salt of a second, combines with these acids in unequal amounts. The present paper demonstrates that the results obtained with mixtures may be predicted with fair approximation from the anion-wool dissociation constants previously assigned to each anion on the basis of titration data. Methods are described for calculating the total acid and the relative proportions of each which are bound. Conversely, it is also shown that approximate values of the dissociation constants may be calculated from the results of experiments with mixtures. 12 p. 5c.

RP1512. Further phase-equilibrium studies involving the potash compounds of portland cement. William C. Taylor.

The present research on the system $K_2O.23CaO.12SiO_2-CaO-5CaO.3Al_2O_3$ is a part of the program designed to determine the manner in which K_2O affects the compound composition of portland cement clinker. Thermal and optical data are presented and a phase-equilibrium diagram of this system has been constructed. The only compounds that were observed in the system under equilibrium conditions are the components of the system and $3CaO.Al_2O_3$. The effect of K_2O on the compound composition of clinker containing K_2O , CaO , MgO , Al_2O_3 , Fe_2O_3 , SiO_2 , and SO_3 has been studied also. The only compounds of K_2O found to be stable are K_2SO_4 and $K_2O.23CaO.12SiO_2$, the K_2O combining preferentially with the SO_3 present. 15 p. 10c.

Title page and contents for volume 29. 6 p. 5c.

RP1513. Mechanical properties of cellulose acetate as related to molecular chain length. Arnold M. Sookne and Milton Harris.

The mechanical properties of films prepared from a series of fractions of cellulose acetate, varying widely in molecular chain length (DP), were determined. A fraction of DP 30 would not form a coherent film; fractions of higher DP showed a rapid improvement of mechanical properties with increase in DP , but above 150, further improvement was slight. A close correlation was found between the results of folding endurance and ultimate elongation measurements. These properties are more sensitive than tensile strength to changes in DP and heterogeneity with respect to DP . Investigation of the properties as a function of both weight-average and number-average DP indicated that at any given weight-average DP the fractions are superior to the blends and, furthermore, those blends which contain fractions of low DP are inferior to those which do not. In contrast, at any given number-average DP within the range studied, the properties of the fractions and all of the blends are approximately equal. 14 p. 10c.

RP1514. Perforated cover plates for steel columns: Compressive properties of plates having ovaloid perforations and width-to-thickness ratio of 53. Ambrose H. Stang and Martin Greenspan.

Tests were made to determine the mechanical properties of perforated cover plates intended to be used as a substitute for lattice bars or batten plates in built-up box-type columns. Each test column was built up from one perforated plate and either two or four angles. Columns with unperforated plates were used as controls.

This paper gives the results of the tests on columns having plates of three different perforation spacings.

It was found that the perforated plates contributed to the strength, and especially to the stiffness, of the columns, and that the factor of stress concentration, due to the presence of the perforations, varied from 2 to 2.6 based on the gross area (1.7 to 2.1, based on the net area). 25 p. 10c.

RP1515. An improved electrode holder for spectrographic analysis. Bourdon F. Scribner and Charles H. Corliss.

An electrode holder has been constructed for improving the speed and ease of operations in miscellaneous spectrographic testing. Advantages afforded by the new holder include: (1) application to a variety of electrode sizes and excitation conditions, (2) positive and precise adjustment and motion of the parts, (3) water-cooling of the electrode clamps, and (4) a housing for protection against light, fumes, and electric shock. The construction of the holder and its application to excitation problems with the high-voltage spark, the a-c arc, and the d-c arc are described. 5 p. 5c.

RP1516. Nature of the reaction of wool with alkali. Louis R. Mizell and Milton Harris.

The course of the reaction of the cystine in wool with alkali has been reinvestigated. The earlier findings that one sulfur atom is split from each molecule of cystine are confirmed. Of the residual noncystine sulfur in the alkali-treated wool, more than 25 percent has been accounted for as lanthionine. No significant amounts of sulfhydryl groups are in the treated wools. The results lead to the conclusion that the alkali cleavage of the disulfide group does not consist primarily in a hydrolytic rupture between the sulfur atoms with the formation of a sulfhydryl compound and a sulfenic acid, as postulated earlier; rather, they are more consistent with a mechanism recently advanced by Nicolet and Shinn, which involves a rupture between sulfur and carbon to yield dehydroalanine and a $-CH_2-S-SH$ residue. An atom of sulfur is then eliminated from the latter and the sulfhydryl group thus formed reacts with dehydroalanine to form lanthionine. 7 p.

RP1517. Photochemical stability of papers. Herbert F. Launer and William K. Wilson.

Papers were irradiated with a carbon arc through a filter that completely eliminated infrared, and ultraviolet shorter than approximately 330 millimicrons. Sheet temperature was kept near 30° C during irradiation, through contact with a thermostated metal backing, thereby eliminating heat effects, shown otherwise to overshadow light effects, using intense sources.

In consequence, the results differed from those of previous workers. Yellowing of papers (without lignin) commonly ascribed to light was found to result from heat or age, but not light; papers bleached when heat effects were eliminated during irradiation. Even lignified paper was bleached by light in nitrogen.

Paper scorched brown at high temperatures or yellowed at 100° C, and yellow papers 250 years old were bleached by light.

Lack of oxygen inhibits but does not altogether prevent photochemical deterioration. The role of water vapor differs fundamentally for cotton and wood-pulp paper.

Lignified paper is very unstable to light. Printers' ink extensively protects paper.

Irradiated papers are subsequently less stable in the dark than those not previously irradiated.

The order of photochemical stability of papers was as follows: new-rag, refined sulfite, old-rag, soda-sulfite, and newsprint. The light stability of new-rag papers was greatly affected by acid and rosin, whereas that of old-rag and soda-sulfite was only slightly affected, in contrast to heat stability, for which pH is important for all fibers. Newsprint, made neutral with NaHCO_3 , showed a large increase in light stability. Rosin did not seriously affect the stability of any papers as long as their acidity was low. 20 p. 5c.

RP1518. Thermal expansion of some bronzes. Peter Hidnert.

The results obtained in the course of independent tests and investigations on the linear thermal expansion of four groups of bronzes designated as tin-zinc, leaded, aluminum, and silicon bronzes are given for different temperature ranges. Curves showing the typical expansion and contraction characteristics of these bronzes during heating and cooling are presented. Ternary diagrams are given to show the effect of composition on the coefficients of expansion of copper-tin-zinc and copper-tin-lead alloys. In general, the coefficients of expansion of these copper-base alloys increase as the addition of tin, zinc, or lead is increased. For the range from 20° to 100° C, the average coefficients of expansion of the various bronzes were found to be between 16.8×10^{-6} and $19.0 \times 10^{-6}/^\circ\text{C}$. 13 p. 5c.

RP1519. Analytical separations by means of controlled hydrolytic precipitation. Raleigh Gilchrist.

To ascertain the completeness of precipitation of hydroxides under conditions of controlled alkalinity in the range pH 1 to 10, experiments were made with over forty of the chemical elements.

Discussion is given of possibilities for analytical separation through controlled hydrolytic precipitation. 11 p.

RP1520. Thermal expansion of titanium. Peter Hidnert.

This paper gives data on the linear thermal expansion of titanium (97.2 percent) at various temperatures between - 190° and + 700° C. The coefficient of expansion of titanium increases from about $5 \times 10^{-6}/^\circ\text{C}$ at - 150° C to about $12 \times 10^{-6}/^\circ\text{C}$ at 650° C. The data on thermal expansion do not indicate the existence of polymorphic transformations of titanium between - 190° and + 700° C. 5 p. 5c.

RP1521. Modification of the Carius combustion tube to minimize losses by explosion: Pressures attained on heating nitric acid to 300°C. Charles L. Gordon.

This paper describes a modified form of tube which minimizes the likelihood of loss by explosion in the Carius method of determining halogens and sulfur in organic substances. The familiar Carius tube of Pyrex glass cannot be sealed properly in the laboratory. Residual strains in the glass seals cause the tubes to burst at pressures much lower than those to be expected from the normal strength of the glass. By sealing smaller neck-tubes on the usual heavy-walled tubes, all the seals except the small final seal can be oven-annealed at the factory.

While the bursting pressure of the unmodified tubes was found to be between 1,000 and 1,400 pounds per square inch, the modified tubes burst at over 2,500 pounds per square inch. The pressures developed during a Carius determination were estimated from determinations of the pressures developed by various amounts of fuming nitric acid in a specially designed gage. Such pressures were found to be below 1,520 pounds per square inch at temperatures up to 300° C when the amount of acid was limited to that customarily used. 5 p. 5c.

RP1522. Measuring the degree of curl of paper. Frederick T. Carson and Vernon Worthington.

In a method frequently used to determine the tendency of paper to curl, a measurement is made of the amount of curl of a small piece of the paper floating on water. The measurement is customarily made in terms of an arbitrarily chosen angle. The maximum curvature, however, is a more logical measure of curliness. An effort had been made to determine the maximum curvature of freely curling paper from measurements made of the curling of paper in contact with water, and the new apparatus devised for the purpose is described. Measurements were made of the relative curliness of a

number of lithographic papers. The correlation of curl with other related properties is discussed. The results of the measurement of curl agree reasonably well with what is known about the behavior in use of the papers studied. 9 p. 5c.

RP1523. Combination of wool protein with weak acids. Jacinto Steinhardt, Charles H. Fugitt, and Milton Harris.

Previous studies of the combination of wool with strong acids have been extended to include 13 weak acids. It is shown that, unlike strong acids, these substances combine with wool in the molecular (undissociated) as well as in the ionic (dissociated) form. The amounts combined as molecules may far exceed the amounts taken up as ions.

Estimates are given of the relative tendencies of these weak acids to combine with wool. They vary over a three-hundredfold range. The negligible effect of temperature on the equilibrium between wool and one of these acids, monochloroacetic, suggests that the combination with undissociated acids is akin to a competitive solvation and involves the displacement of combined water. 6 p. 5c.

RP1524. pH values of certain phosphate-chloride mixtures, and the second dissociation constant of phosphoric acid from 0° to 60° C. Roger G. Bates and S. F. Acree.

Measurements of the electromotive forces of galvanic cells composed of hydrogen and silver-silver-chloride electrodes in aqueous chloride-phosphate solutions were made at 5-degree intervals from 0° to 60° C. The solutions were mixtures of sodium chloride, disodium hydrogen phosphate, and either sodium or potassium dihydrogen phosphate; three ratios of the molalities of the two phosphate salts were employed, and a wide range of concentrations was covered. The second dissociation constant was evaluated from the experimental data. The values of the negative logarithm of the constant at each of the 13 temperatures studied may be computed from the following equation:

$$pK_2 = 1979.5/T - 5.3541 + 0.019840T,$$

where T is in degrees Kelvin.

For each temperature, the heat and entropy of dissociation, the change of heat capacity, and the free-energy change accompanying the dissociation of 1 mole of $H_2PO_4^-$ were computed from the variation of the second dissociation constant with temperature.

The pH value of each solution was calculated. The pH values from 0° to 60° C of mixtures of sodium (or potassium) dihydrogen phosphate, disodium hydrogen phosphate, and sodium chloride, in which $m_{H_2PO_4} = m_{Cl}$ and the ratio of the molality of $H_2PO_4^-$ to that of HPO_4^{2-} lies between 0.2 and 5.0, are given by the equation

$$(pH)_t = (pK_2)_t - \log (m_{H_2PO_4}/m_{HPO_4}) - 3A\sqrt{\mu}/(1 + Ba_1\sqrt{\mu}),$$

where μ is the ionic strength. These solutions are proposed as pH standards in the range 6.4 to 7.4. 27 p. 10c.

RP1525. Miniature Geiger-Müller counter. Leon F. Curtiss.

A miniature Geiger-Müller tube counter having a tube 0.8 mm in internal diameter is described. This "hypodermic-needle" type of counter has been found useful in locating and measuring a well-defined beam of gamma radiation. It could also be used to measure a beam of hard X-rays reflected from a crystal. Another suggested use is direct insertion into specimens, such as living biological material. 2 p. 5c.

RP1526. Occurrence of sucrose and inulin-hydrolyzing enzymes in commercial enzyme preparations. William Ward Pigman.

The relative enzyme content of enzyme preparations which hydrolyze sucrose and inulin was determined for 14 enzyme preparations representing the principal commercial types available. Those of fungal origin seem invariably to contain invertases in about 0.5 to 1.0 percent of the quantities in commercial purified yeast invertase preparations. Enzyme preparations from plant sources (wheat, almond, and malt), from animal tissues (pancreases), and from *Bacillus mesentericus* had negligible contents of invertase. Enzyme preparations from *Aspergillus niger* and yeast exhibited considerable ability to hydrolyze inulin, those from *Aspergillus oryzae* and *A. flavus* exhibited some slight activity, and preparations from other sources were essentially inactive. For several representative enzyme preparations, the rate of hydrolysis of inulin and sucrose was studied and found to approximate a first-order reaction. The activity of the inulase in several *A. niger* enzyme preparations was found to be greatest in the range pH 3 to 4. Invertase preparations from *A. niger* were most active at pH 3 to 4 and those from *A. oryzae* at pH 5.0 to 5.5.

The results are considered from the viewpoint of the Weidenhagen theory, and it is shown that the original theory is incompatible with the present results in that either the invertases and inulases are different enzymes or they represent a class of enzymes (fructofuranosidases) in which the individual members vary according to the source. Thus the ratio of invertase to inulase activity varies from about 5 for the *A. niger* preparations to more than 4,000 for the yeast preparation. Following the suggestion of Helferich, the term "emulsin" is used as a synonym for a crude mixture of enzymes.

It is shown that the *A. niger* emulsins hydrolyze juices from the jerusalem artichoke, which contain levulose polysaccharides. This reaction may be useful for the commercial production of levulose from this source, as enzymic hydrolysis has certain advantages that may offset the high cost of the enzyme preparation.

Consideration is given to the different methods available for expressing enzyme activity. It is shown, for the enzymes reported in the present paper, that the pseudo first-order reaction constant is proportional to the enzyme concentration over a fairly wide range, and that this constant may be utilized for the expression of the enzyme content of various emulsins. Since the substrate concentration must be specified, it is suggested that the concentrations proposed by Weidenhagen be generally accepted, and that his standard conditions of temperature, etc., also be adopted. 17 p. 5c.

RP1527. Perforated-cover plates for steel columns: Compressive properties of plates having circular perforations and a width-to-thickness ratio of 53. Ambrose H. Stang and Martin Greenspan.

Tests were made to determine the mechanical properties of perforated cover plates intended to be used as a substitute for lattice bars or batten plates in built-up box-type columns. Each test column was built up from one perforated plate and either two or four angles. Columns with unperforated plates were used as controls.

This paper gives the results of the tests on columns having plates of three different perforation spacings.

It was found that the perforated plates contributed to the strength and to the stiffness of the columns, and that the factor of stress concentration, due to the presence of the perforations, varied from 2.5 to 3.4 based on the gross area (2.2 to 2.8 based on the net area). 26 p. 10c.

RP1528. Part-wool blankets for use in barracks. Herbert F. Schiefer, Louis R. Mizell, and F. T. Mosedale.

The properties of 33 part-wool blankets of 8 constructions were measured, and the changes produced by 10 washings were observed. It is concluded that part-wool blankets should prove quite satisfactory for use in barracks in place of the all-wool army blanket, thereby effecting a substantial saving of wool, which might be needed for other military purposes. 6 p. 5c.

RP1529. Advantages of a blanket-and-sheet combination for outdoor use. Herbert F. Schiefer.

Blankets varying greatly in air permeability were tested alone and in combination with one and with two sheets for air permeability and thermal transmission. The air permeability of the sheets was low in comparison with that of the blankets. The results show the effect of moving air on the thermal transmission of the blankets and of the blankets between two sheets. The effect of laundering on the weight, thickness, compressibility, compressional resilience, breaking strength, air permeability, and thermal transmission of the blankets is also reported.

It is concluded that for outdoor use, where protection against the wind and rain or snow is important, as in an open lifeboat at sea, a combination of a blanket and sheet or wind-resistant cloth would afford far more protection than a blanket alone. 6 p. 5c.

RP1530. Composition and physical properties of aqueous extracts from portland cement clinker pastes containing added materials. George L. Kalousek, C. H. Jumper, and J. J. Tregoning.

Mixtures of 12 commercial portland cement clinkers and water were filtered at 7 minutes and at 2 hours after mixing, and the chemical composition, pH, conductivity, surface tension, and density of the extracts were determined. The effects on the composition and physical properties of the extracts, produced by the addition of small amounts of various materials to the pastes, were studied in parallel experiments. The added materials included gypsum, which was used in preparing the cements from the clinkers, calcium chloride, calcium acetate, fluosilicic acid, sucrose, T D A, tannic acid, and triethanolamine.

In the majority of the extracts, soda and potash were present in greater amounts

than any of the other dissolved oxides. Relatively high concentrations of sulfate occurred in the extracts of the clinkers that contained the larger amounts of potash. The lime concentration and basicity of the extracts were largely determined by the amounts of alkali oxides present. The concentration of silica corresponded approximately to the reported solubility of silica in lime solutions. Low concentrations of oxides of the R_2O_3 group were found except in extracts from pastes containing the added organic materials. 41 p. 10c.

RP1531. Classification of carbohydrases. William Ward Pigman.

A system for the classification of the carbohydrases has been proposed by Weidenhagen, and, although it has considerable value, it also has a number of obvious deficiencies. It is demonstrated in the present paper that many of these difficulties may be obviated by considering the individual enzymes of Weidenhagen, e. g., α -glucosidase, as classes of enzymes of similar action but varying according to the source. The results of more recent studies of the specificity of the carbohydrases are considered, and the action of enzymes on pentoses, hexoses, and heptoses of similar ring conformations is interpreted. These results and the conception of the complex nature of Weidenhagen's individual enzymes are utilized in the establishment of a provisional system for the classification of the carbohydrases. 9 p. 5c.

RP1532. Further experimental study of beater practice in the manufacture of offset papers. Charles G. Weber, Merle B. Shaw, and Martin J. O'Leary.

Seventy-three experimental papers have been made in the Bureau's experimental paper mill in studies to determine the relationship between the mechanical beating of the fibers and the properties of offset papers made from them. A previous publication contains the data for the wood-fiber papers. The present article reports an extension of the work to include papers made of rag fibers, and mixtures of rag and wood fibers.

The rag fibers responded to beating differently in some respects than the wood fibers. Old rags withstood the prolonged beating required for the development of maximum strength and optimum formation without the adverse effects of such treatment noted in the preparation of wood fibers. All the rag-fiber papers had appreciably lower expansivity than wood-fiber papers of corresponding bond strength, and the mixture of old-rag fibers with strong sulfite, in equal proportions, produced papers with folding endurance approaching the average for the two pulps. Papers made of the sulfite pulp and wood-fiber filler pulp in like proportions have been found to have fold values little above that of the weaker pulps.

The addition of clay filler to a sulfite paper lowered the expansivity in the machine direction but did not lower it appreciably in the cross direction. 13 p. 5c.

RP1533. Effects of added materials on some properties of hydrating portland cement clinkers. Edwin S. Newman, Raymond L. Blaine, Charles H. Jumper, and George L. Kalousek.

Studies were made of the effects of added materials on the properties of a group of portland cement clinkers representing standard-portland, moderate-heat-of-hydration, high-early-strength, sulfate-resistant, and white cements. The materials used were gypsum, sugar, calcium chloride, TDA (grinding aid), tannic acid, triethanolamine, calcium acetate, and fluosilicic acid. The effects were judged by comparing the results of tests of specimens of clinker pastes containing the materials under investigation with the results of similar tests of the clinker pastes to which nothing had been added.

It was found that although some of the materials caused large changes in the behavior of the clinker pastes during their early history, these effects largely disappeared thereafter. Few of the substances had much effect on the results of tests performed at 28 days. No tests were made to evaluate the effect of the added materials after longer periods. 21 p. 10c.

RP1534. Some properties of heat-setting refractory mortars. Raymond A. Heindl and William L. Pendergast.

Twelve brands of the heat-setting type of refractory mortar were studied with respect to sieve analysis, pyrometric cone equivalent, amount of mixing water required, troweling and drying properties, and strengths after heating at various temperatures. The tendency of the mortars to shrink, crack, and adhere when exposed to high temperatures, both in fusion blocks and in units of three bricks each, was also investigated. 8 p. 5c.

RP1535. Sources of error in precise commercial refractometry. Leroy W. Tilton.

Exclusive of compensators, the mechanical requirements for accurate refractometry to a few units of the fifth decimal place in index are difficult but not impracticable.

Optical requirements are high because the symmetrical use of all apertures is, in general, not possible. If it is necessary to distinguish between index of sample referred to air at t or at t_0 , this usually can be done by choice of a relative or an absolute temperature coefficient when correcting for temperature of the refractometer block. For an error of 1×10^{-5} in index of solids, the permissible prism of contact liquid is one-third fringe per centimeter as viewed in the exit pupil of the telescope. The requirements for minimum shielding of critically refracted rays, for absence of certain interference fringes in the field of view, and for surfacing of the illuminating prism are so related with reference to measurements on small samples of liquid that compromises are necessary in the design of precision refractometers. 18 p. 10c.

RP1536. Nature of the prismatic dark interstitial material in portland cement clinker. William C. Taylor.

As a result of a series of previous investigations by the phase equilibrium method, it has been concluded that K_2SO_4 and $K_2O.23CaO.12SiO_2$ are the only compounds containing K_2O that may exist when a mixture of K_2O , CaO , MgO , Al_2O_3 , Fe_2O_3 , SiO_2 , and SO_3 , in the proportions occurring in portland cement clinker, is heated and cooled under equilibrium conditions. Frequent observations of a prismatic dark interstitial phase in etched, polished sections of commercial clinker and in rapidly cooled laboratory clinkers led to the present study of the relation of this phase to the system $K_2O.23CaO.12SiO_2-CaO-5CaO.3Al_2O_3$ and to other systems involving K_2O . The prismatic phase has not been found to exist under equilibrium conditions, but has been produced only under conditions of rapid cooling. Both thermal and compositional conditions that have been found to be required for its formation suggest that it may be a metastable form of $3CaO.Al_2O_3$ and monotropic with respect to the stable, isotropic, rectangular $3CaO.Al_2O_3$. That portion of K_2O combined as K_2SO_4 has been found to have no effect in inducing the formation of the prismatic phase. The conditions necessary for the formation of this phase have been outlined. Although the exact composition has not been established definitely, because of the experimental difficulties that have been outlined, the close relationship between the prismatic phase and $3CaO.Al_2O_3$ leads to the recommendation that this phase be referred to as "prismatic $3CaO.Al_2O_3$ " instead of the term "prismatic dark interstitial material." 18 p. 15c.

RP1537. Dissociation constants and pH-titration curves at constant ionic strength from electrometric titrations in cells without liquid junction: Titrations of formic acid and acetic acid. Roger G. Bates, Gerda L. Siegel, and S. F. Acree.

An improved method for obtaining the titration curves of monobasic acids is outlined. The sample, 0.005 mole of the sodium salt of the weak acid, is dissolved in 100 ml of a 0.05- m solution of sodium chloride and titrated electrometrically with an acid-salt mixture in a hydrogen-silver-chloride cell without liquid junction. The acid-salt mixture has the composition: nitric acid, 0.1 m ; potassium nitrate, 0.05 m ; sodium chloride, 0.05 m . The titration therefore is performed in a medium of constant chloride concentration and of practically unchanging ionic strength ($\mu = 0.1$). The calculations of pH values and of dissociation constants from the emf values are outlined. The titration curves and dissociation constants of formic acid and of acetic acid at 25° C were obtained by this method. The pK values (negative logarithms of the dissociation constants) were found to be 3.742 and 4.754, respectively. 13 p. 5c.

RP1538. Function of carbon dioxide in producing efflorescence on plaster and cement products. Dana L. Bishop.

Hydrated magnesium sulfate was identified as the principal compound in efflorescence on white-coat plaster finish. This salt is not a constituent of the white-coat backing but is formed by reactions involving gypsum and magnesia in the plaster, carbon dioxide from the air, and water. The reaction to form magnesium sulfate cannot take place until after the $Ca(OH)_2$ has been changed to $CaCO_3$. Magnesium sulfate efflorescence may also be formed on cement products by the same reactions. 6 p. 5c.

RP1539. Study of the system $CaO-Al_2O_3-H_2O$ at temperatures of 21° and 90° C. Lansing S. Wells, W. F. Clarke, and H. F. McMurdie.

A study has been made of the system $CaO-Al_2O_3-H_2O$ at temperatures of 21° and 90° C. Diagrams have been constructed showing the solubility relations of the various phases at these temperatures. The solid phases were investigated by petrographical and X-ray diffraction methods. By means of X-ray diffraction patterns, it was found that the so-called hexagonal tricalcium aluminate hydrate is in reality a mixture of hexagonal $2CaO.Al_2O_3.8H_2O$ and hexagonal $4CaO.Al_2O_3.13H_2O$ intercrystallized in equimolecular proportions. On standing at room temperature, dry dicalcium aluminate

hydrate is slowly converted into the tetracalcium aluminate hydrate and hydrated alumina. Loss of water of hydration in the tetracalcium aluminate hydrate results in a decrease in the unit cell along the *c* axis. Although the hexagonal di- and tetracalcium aluminate hydrates exist only as metastable phases in the system between 21° and 90° C, their approximate solubility relationships were ascertained at 21° C. As the temperature increases, the hexagonal aluminates become less stable. The only stable phases that occur in the system $\text{CaO-Al}_2\text{O}_3\text{-H}_2\text{O}$ at atmospheric pressure over the temperature range of 21° to 90° C are gibbsite ($\text{Al}_2\text{O}_3\cdot 3\text{H}_2\text{O}$), the isometric tricalcium aluminate hexahydrate ($3\text{CaO}\cdot\text{Al}_2\text{O}_3\cdot 6\text{H}_2\text{O}$), and $\text{Ca}(\text{OH})_2$. The solubility curves of these three stable phases in the system $\text{CaO-Al}_2\text{O}_3\text{-H}_2\text{O}$ were determined at 21° and 90° C. Over this temperature range, gibbsite is the stable phase up to a concentration of 0.33 g of CaO per liter; at concentrations greater than this, $3\text{CaO}\cdot\text{Al}_2\text{O}_3\cdot 6\text{H}_2\text{O}$ is the stable phase until those points are reached at which $\text{Ca}(\text{OH})_2$ also appears as a solid phase. The series of invariant points for gibbsite and the isometric phase occur at a concentration of 0.33 g of CaO per liter, but with the concentration of Al_2O_3 increasing from 0.02 g of Al_2O_3 per liter at 21° C to 0.11 g of Al_2O_3 per liter at 90° C. 43 p. 10c.

RP1540. Perforated cover plates for steel columns: Compressive properties of plates having a net-to-gross cross-sectional-area ratio of 0.33. Ambrose H. Stang and Martin Greenspan.

Tests were made to determine the mechanical properties of perforated cover plates intended to be used as a substitute for lattice bars or batten plates in built-up box-type columns; Each test column was built up from one perforated plate and four angles. Two columns had circular and two ovaloid perforations. For each column the ratio of net-to-gross cross-sectional area in the plate was 0.33.

In this paper the methods of test are described, and the results of the tests of the four columns are given. 16 p. 10c.

RP1541. Thermal expansivity and density of indium. Peter Hidnert and Mary Grace Blair.

The linear thermal expansion of cast indium of high purity was investigated between -190° and +100° C and the cubical thermal expansion between 0° and 50° C. The following equation was derived for the linear expansion of indium:

$$L_t = L_0[1 + (28.9t + 0.013t^2) 10^{-6}],$$

where L_0 represents the length of the metal at 0° C, and L_t the length at any temperature, t , within the range of the observations. The average coefficients of cubical expansion of indium were found to be 77×10^{-6} and 101×10^{-6} per degree centigrade for the ranges 0° to 25° C and 25° to 50° C, respectively. These coefficients of cubical expansions are not equal to three times the coefficients of linear expansion for the corresponding temperature ranges on account of the anisotropy of indium.

The density of cast indium was found to be 7.281 g/cm³ at 22.6° C. The density of indium calculated from the best available data on atomic weights and lattice constants is 7.40 g/cm³. Observed densities at 0°, 25°, and 50° C are also given in this paper. 7 p. 5c.

RP1542. Measurements of ultraviolet solar radiation in Washington, 1936 to 1942. W. W. Coblenz and R. Stair.

Continuing earlier measurements of ultraviolet solar radiation (RP877), a summary is given of similar measurements made during the years 1936 to 1942, in Washington, D. C. Marked variations in the spectral quality and total intensity of ultraviolet solar radiation, attributable to variations in atmospheric turbidity, and, to a less extent, to well-known cyclonic and seasonal changes in ozone concentrations in the stratosphere, are recorded. On the clearest days the biologically effective ultraviolet of wavelengths shorter than 3132 Å, incident directly from the sun and the surrounding sky at midday, ranges from about 75 microwatts per square centimeter ($\mu\text{w}/\text{cm}^2$) in midsummer to about 12 $\mu\text{w}/\text{cm}^2$ in midwinter. 13 p. 5c.

RP1543. A tungsten-in-quartz lamp and its applications in photoelectric radiometry. R. Stair and W. O. Smith.

This paper gives constructional data relating to a tungsten-filament-in-quartz lamp and a discussion of its applications to precision filter radiometry. This lamp is adapted for use in the calibration of the spectral and total radiation sensitivity of phototubes. In its applications, it supplements the spectroradiometer for calibrating phototubes while employing the tubes with the associated filters used in measuring the radiation under the investigation.

The spectral radiation output from such a lamp depends upon the temperature

of the filament, the emissivity of tungsten, and the transmission of the fused-quartz envelope. A table of relative blackbody radiation intensities has been calculated for the temperature range 2,500° to 2,900° K in the wavelength interval 2300 to 3500 angstroms. 11 p. 10c.

RP1544. Effect of turbulence and channel slope on translation waves. Garbis H. Keulegan and George W. Patterson.

This paper is the second of a series dealing with the motion of flood waves and other waves of translation in open channels. The first paper considered waves controlled solely by inertia forces; the present one is an analysis of the combined effects of turbulent friction and inertia. The basic equation of motion for gradually varied unsteady flow in prismatic channels is derived from fundamental principles. The effect of the velocity distribution in the original undisturbed current on the motion of short waves is investigated, and the effects of wave height, curvature of profile, and fluid friction on the celerity of a wave-volume element is analyzed in detail. The deformation of a straight sloping front and the change of height of an abrupt wave front is treated. Special emphasis is laid on disturbances of negligible curvature and practical methods of handling engineering problems arising in connection with the operation of locks or hydroelectric canals are given. 52 p. 10c.

Title page and contents for volume 30. 6 p. 5c.

RESEARCH PAPERS FROM NATIONAL BUREAU OF STANDARDS JOURNAL OF RESEARCH
VOLUME 31, JULY—DECEMBER 1943

RP1545. Width and spacing of tensile cracks in axially reinforced concrete cylinders. David Watstein and Douglas E. Parsons.

In a study of the spacing and width of tensile cracks, axially reinforced cylinders were tested by applying tensile forces to the reinforcement and observing the deformations of the concrete and the spacing and the width of cracks. The test data and theoretical equations were in good agreement with respect to the effects of the principal factors controlling the spacing and the width of cracks. The spacing and the width of cracks were found to depend chiefly on the ratio of the diameter to the percentage of reinforcement and the nature of the deformations on the bars. It is concluded that the use of a type of reinforcement bar that will afford more reliable anchorage would result in better control of cracking of reinforced concrete and economy in the use of reinforcement steel. 24 p. 10c.

RP1546. Autographic load-elongation apparatus for fibers. Arnold M. Sookne and Henry A. Rutherford.

An autographic load-elongation apparatus for testing single fibers is described. The apparatus is adapted to making a continuous load-elongation record at constant rate of elongation and to making a point by point record at constant rate of loading. It is also useful for obtaining relaxation curves for single fibers. It combines the principles of a hand-operated machine developed in this laboratory and an automatic electronic balance developed by Muller and Garman [5].² Sensitive automatic operation is attained by means of photoelectric controls, and autographic recording in rectangular coordinates is provided. Examples are given of the performance of the apparatus. 7 p. 10c.

RP1547. Ring structures and mutarotations of the modifications of *d*-galacturonic acid. Horace S. Isbell and Harriet L. Frush.

A study of the two crystalline modifications of galacturonic acid has been made with the object of determining their ring structure. The results show that they are a pair of alpha-beta pyranoses analogous to the alpha and beta galactopyranoses. On oxidation with bromine water, the two modifications yield optically active lactones of mucic acid. 12 p. 5c.

RP1548. Ten-year tests on commercial masonry cements. R. L. Blaine.

In an investigation of the properties of 41 commercial masonry cements reported in 1934, additional specimens were made for test at a later age. Two-inch mortar cubes made of these cements were tested in compression after both water and air storage for 10 years. Mortar bar specimens were measured for linear change after storage in water for 10 years.

The compressive strengths of the 1:3 (cement to standard sand) mortar cubes varied from 200 to 6,000 lb/in.² at 10 years. Variables such as type of cement, amount of mixing water, ratio of cement to sand, gradation of sand, as well as storage conditions are shown to affect not only the strength at 10 years but also the gain in strength between 28 days and 10 years.

The length measurements indicate a trend of greater expansion with greater magnesia content of the cement. 9 p. 5c.

RP1549. Tristimulus specification of the Munsell book of color from spectrophotometric measurements. Kenneth L. Kelly, Kasson S. Gibson, and Dorothy Nickerson.

The development of the Inter-Society Color Council-National Bureau of Standards (ISCC-NBS) system of color names, based on the standards in the Munsell Book of Color, made it necessary to specify the master standards of this book in fundamental terms. Accordingly, spectral reflection curves were run for each of the 421 master standards on the General Electric recording spectrophotometer at the National Bureau of Standards, using slit widths of approximately 4 millimicrons. Various corrections were applied to these spectrophotometric data in accordance with methods regularly used for such work at the Bureau. Colorimetric computations were then made with these data, resulting in tristimulus specifications according to the 1931 ICI standard observer and coordinate system. Four illuminants were used: ICI illuminants *A* and *C*, representative of incandescent-lamp light and average daylight, respectively, illuminant "*D*" (lightly overcast north sky), and illuminant "*S*" (extremely blue sky). The colorimetric specifications of the Munsell standards for all four illuminants are thus given.

The trilinear coordinates for the Munsell standards calculated for ICI illuminant *C* have been plotted on large chromaticity (*x*, *y*) diagrams and constant Munsell chroma lines drawn in. (Similar values obtained by Glenn and Killian at the Massachusetts Institute of Technology in 1935 for Munsell color standards bearing the same hue-value-chroma designations have also been plotted on the diagrams and differences between the two sets of data are discussed.) These diagrams serve as means for determining the Munsell notation and thereby the ISCC-NBS color name for any color whose trilinear coordinates and apparent reflectance are given. 22 p. 25c.

RP1550. Thermal expansion of some industrial copper alloys. Peter Hidnert and George Dickson.

This paper gives data on the linear thermal expansion of some industrial copper-nickel, copper-nickel-aluminum, copper-nickel-tin, and miscellaneous copper alloys (copper-tin, copper-lead-antimony, copper-manganese-aluminum, copper-nickel-iron, copper-nickel-zinc, copper-nickel-tin-lead, copper-nickel-zinc-iron, copper-tin-zinc-lead, copper-zinc-aluminum-iron-manganese) for various temperature ranges between 20° and 900° C. The addition of 3 percent of nickel or the combined addition of 4.5 percent of nickel and 5 percent of aluminum to copper was found to have little effect on the linear thermal expansion. The effect of various treatments on these copper-nickel and copper nickel-aluminum alloys was also small. The coefficients of expansion of two copper-nickel-tin alloys containing 20 and 29 percent of nickel were appreciably less than the coefficients of expansion of copper for temperature ranges between 20° and 600° C. Three copper alloys containing more than 28 percent of nickel showed the smallest coefficients of expansion of the miscellaneous alloys. The coefficients of expansion of the copper alloys reported in this paper were found to be between 14.9×10^{-6} and 20.4×10^{-6} per degree centigrade for the range from 20° to 100° C. 6 p. 5c.

RP1551. Optical rotation and atomic dimension: The four optically active 2-halogenopentanes. Dirk H. Brauns.

In previous articles by the author it is suggested that certain optically active halogen derivatives may be divided into two classes. The first class has the halogen directly attached to an asymmetric carbon atom. For these substances the writer has formulated the rule that the differences of their specific rotations, (Cl-F), (Br-Cl), and (I-Br) have the same numerical relation as the respective differences of the radii of the covalent-bonded atoms (41:17:21). The second class of optically active halogen derivatives has the halogen attached indirectly (by a chain of atoms) to an asymmetric carbon atom. For these latter substances the rule was formulated that the differences of their molecular rotations have a numerical relation, which likewise agrees with that for the respective differences of the radii of the neutral halogen atoms.

As these rules were established for halogen derivatives of carbohydrates, which contain several asymmetric carbon atoms, it was found desirable to investigate halogen derivatives, which contain only one asymmetric carbon. The results of the last investigation (see footnote 1) showed that the derivatives of the amyl alcohol, 2-methylbutanol-1, checked the above rule for the second class very well. The present communication reports the results obtained in checking the above rule for the first class with the halogen derivatives of the other active amyl alcohol, pentanol-2. Pure optically active *D*- and *L*-pentanol-2 were prepared and halogenated by different methods in order to obtain the 2-fluoro-, 2-chloro-, 2-bromo-, and 2-iodopentanes of highest rotation.

In spite of the difficulty that a partial inversion takes place in the halogenation,

resulting in a mixture of *D* and *L* halogen derivative, the conclusion can be drawn that rule I is not contradicted by the values found, since the deviations can be plausibly explained by the incompleteness of the Walden inversion. Rule II should not be applicable to this type of compound, and the results confirm this.

It is further shown that all halogen derivatives of pentanol-2 of like configuration have the same sign of optical rotation. The specific gravity, refractive index, and boiling points at various pressures were also determined. 24 p. 10c.

RP1552. Tensile and other properties of concretes made with various types of cements. Louis Schuman and John Tucker, Jr.

An improved tensile-test method for concrete has been developed. Cylindrical specimens, 4 by 16 inches, are used, and loads are applied at both ends through threaded rods embedded in a rich mortar. Compressive- and tensile-strength and stress-strain determinations have been made for concretes made with various types of cements, including cements with aerating agents, and with various aggregates. At early ages, strengths for moderate-heat cements were but slightly lower than for normal cements, whereas those for high-early-strength cements were considerably higher. Tensile strengths usually attained maximum values between 7 days and 3 months. Tensile strengths depended on compressive strengths, type of cement, type of aggregate, and on sand-gravel ratios. 18 p.

RP1553. Properties of cast red brass as affected by the ambient atmosphere during melting. Harold B. Gardner, Alexander I. Krynitsky, and Charles M. Saeger, Jr.

A study was made of the physical properties of red brass (Cu, 85; Sn, 5; Pb, 5; Zn, 5), melts of which had been made and poured in an atmosphere of hydrogen, nitrogen, methane, carbon dioxide, carbon monoxide, and air. The tensile properties, hardness, density, and electrical resistivity of the sand-cast bars, in general were inferior to those of the chill-cast metal. For both the sand-cast and chill-cast bars, hydrogen and methane had deleterious effects. The effect of hydrogen was most pronounced and detrimental. The unsoundness of the hydrogen-treated metal, as shown by microstructural study and by density surveys, is the most important factor responsible for the inferior properties of the metal treated in this way. 16 p. 10c.

RP1554. Electrical and mechanical properties of the system Buna S-gilsonite. Alan H. Selker, Arnold H. Scott, and Archibald T. McPherson.

Buna S compounds containing gilsonite have properties that render them suitable for the insulation of communication cables. The principal limitation of these compounds as produced at the time of this investigation was that Buna S contained constituents which caused relatively high water absorption. Electrical measurements were made of gilsonite and of compounds of Buna S containing from 0 to 56 percent of gilsonite by volume, i. e., from 0 to 150 parts by weight per 100 parts of Buna S and 12 parts of other ingredients. The base compound contained, in parts by weight: Buna S, 100; stearic acid, 2; zinc oxide, 5; accelerator, 2; and sulfur, 3. The dielectric constant of this base compound at 1,000 cycles per second was 2.85, and the power factor 30×10^{-4} ; the d-c conductivity was 11×10^{-16} mho/cm 1 minute after application of potential. Under the same conditions the dielectric constant of the gilsonite alone was 2.60, the power factor 15×10^{-4} , and the conductivity less than 2×10^{-16} mho/cm. Most of the requirements of the United States Coast Guard specifications for the insulation of submarine cable were met by a compound containing 25.6 percent of gilsonite by volume, or 40 parts of gilsonite by weights per 100 parts of Buna S and 12 parts of other ingredients. This compound had the following properties; dielectric constant at 1,000 cycles per second, 2.78, and power factor, 65×10^{-4} ; d-c conductivity, 4×10^{-16} mho/cm; tensile strength, 1,200 lb/in²; ultimate elongation, 470 percent; tensile stress at an elongation of 200 percent, 560 lb/in². At the frequencies at which the measurements were made, namely 100, 1,000, 7,500, and 100,000 cycles per second, the dielectric constant of the base compound decreased from 2.88 to 2.78, and the power factor increased from 15×10^{-4} to 145×10^{-4} . The change with frequency became smaller with additions of gilsonite. Extraction of the Buna S with water before compounding removed about 0.8 percent of water-soluble materials and reduced the absorption of water to about one-third of the value for the commercial material. The change of dielectric constant on immersion in water was reduced by prolonged washing of the Buna S, but the power factor was little affected. 21 p. 10c.

RP1555. Calcium chloride compounds of *D*- α -glucoheptose (*D*-glycero-*D*-gulo-aldoheptose). Horace S. Isbell and Harriet L. Frush.

In support of the concept that sugars having like configurations for the atoms comprising the pyranose ring have like properties, it has been found that *D*-glycero-

D-gulo-aldoheptose (formerly *D-α-gluco*heptose) resembles *D-gulose* in that it forms crystalline compounds with calcium chloride, and in that the equilibrium which exists in aqueous solutions is shifted in marked degree by changes in the concentration of calcium chloride. It was shown that the addition of calcium chloride shifts the equilibrium toward the unknown alpha-pyranose modification. The equilibrium optical rotation of *D-glycero-D-gulo*-aldoheptose in a 4-percent aqueous solution in the presence of calcium chloride varies according to the relationship

$$[\alpha]_D^{20} = -20.2 + 3.54m - 0.067m^2,$$

in which *m* is the grams of calcium chloride per 100 ml of solution. A crystalline compound, *β-D-glycero-D-gulo*-aldoheptose. $\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$, was prepared and its mutarotation was measured. In 4-percent aqueous solution,

$$[\alpha]_D^{20} = -6.5 \times 10 - .0072t - 9.3$$

6 p. 5c.

RP1556. Density of leather and its significance. Joseph R. Kanagy and Everett L. Wallace.

The real density of leather calculated from the weight of a measured volume, allowing for voids, and the apparent density of leather calculated from the weight of a measured volume, not allowing for voids, were studied. The real-density values of different samples of leather and a sample of raw hide were determined by a method in which Boyle's law is applied. The apparent density of some of these samples, obtained by direct dimensional measurement and by displacement of mercury, is compared with the real density. The real densities of most of the samples vary within a narrow range (1.387 to 1.516), whereas the apparent densities vary over a greater range, depending upon the treatment. For this reason the apparent density is believed to be a more valuable factor for most practical considerations. The influence of location of the specimen on the hide on real density is considered, and results that show the effect of compression on both densities are given. Moisture content is shown to have considerable influence on the real density. For leathers that do not have abnormally high grease contents, the permeabilities to air and water vapor appear to show some correlation to the percentage of voids, which is calculated from the ratio of the apparent to the real density. 11 p. 5c.

RP1557. A counting method for the determination of small amounts of radium and of radon. Leon F. Curtiss and Francis J. Davis.

A method for determining small quantities of radon is described, in which the alpha particles from the radon and RaA and RaC are counted in an ion-counting chamber. Details of an arrangement for automatically making a printed record of the hourly totaled count are given. Advantages of this method over that using an ionization chamber with electrometer are discussed. 15 p.

RP1558. The assay of potassium *p*-phenolsulfonate, its pH range, and its ultraviolet absorption spectrum. Elizabeth E. Sager, Marjorie R. Schooley, and S. F. Acree.

Potassium *p*-phenolsulfonate is a good buffer for the pH range of 8.4 to 9.2 and for spectrophotometric studies of metacresolsulfonphthalein and thymolsulfonphthalein. Its useful pH range lies between those for borates and secondary phosphates and therefore fills an important gap. The purified product is not commercially available, and quantitative tests for indicating its purity have not been reported. It was found that a pure product may be obtained after only three recrystallizations. A quantitative method of analysis by bromometric titration was developed. Two molecules of bromine react quantitatively with 1 molecule of *p*-phenolsulfonate in molar hydrochloric acid at 0° C within 5 minutes.

Ultraviolet absorption spectra were obtained and showed differences between the primary and the secondary salt. The spectrophotometric data indicate that the sulfonate group is almost completely ionized in dilute solutions. 8 p. 5c.

RP1559. The second dissociation constant of *p*-phenolsulfonic acid and pH values of phenolsulfonate-chloride buffers from 0° to 60° C. Roger G. Bates, Gerda L. Siegel, and S. F. Acree.

The thermodynamic dissociation constant of the phenol group of *p*-phenolsulfonic acid was calculated from electromotive-force measurements of hydrogen-silver-chloride cells without liquid junction. Thirty-nine buffer mixtures of potassium *p*-

phenolsulfonate, sodium hydroxide, and sodium chloride were studied in five series of experiments from 0° to 60° C at intervals of 5 degrees. In three series, the molal ratio of phenolsulfonate ion to phenolate-sulfonate ion was unity, and in two series the buffer ratio was 2:3. For two series of experiments, one at each buffer ratio, the molality of sodium chloride was maintained constant near 0.05 for all dilutions of the buffer. In the other experiments, the molality of each component of the solution varied between 0.0037 and 0.1.

The values of pK_2 , the negative of the common logarithm of the second dissociation constant, between 0° and 60° C are given by the equation

$$pK_2 = 1961.2/T - 1.1436 + 0.012139T,$$

where T is in degrees Kelvin.

Equations were formulated to give the changes of free energy, heat content, entropy, and heat capacity that accompany the dissociation at infinite dilution of a mole of phenolsulfonate ion at any temperature between 0° and 60° C. For the dissociation of the phenol group at 25° C, ΔF° is 12,351 cal, ΔH° is 4,036 cal, ΔS° is -27.9 cal deg⁻¹, and ΔC_p° is -33 cal deg⁻¹.

The pH value of each buffer-chloride mixture was calculated from the experimental data and the activity coefficients that were found to characterize each series of solutions. The pH values of other phenolsulfonate buffers which have molal ratios, m_1/m_2 , of phenolsulfonate ion to bivalent phenolate-sulfonate ion between 2/3 and 1 can be computed for temperatures between 0° and 60° C with an accuracy of +0.002 unit from their compositions and from the dissociation constants and ionic parameters given in this paper. The equation used is

$$pH = pK_2 - \log(m_1/m_2) - 3A\sqrt{\mu}(1 + 8B\sqrt{\mu}),$$

where μ is the ionic strength. Buffer solutions of this type are suitable pH standards in the range 8.6 to 9.0. 19 p. 10c.

RP1560. X-ray patterns of hydrated calcium silicates. Howard F. McMurdie and Einar P. Flint.

X-ray powder diffraction data of 15 hydrated calcium silicates are reported as a supplement to a previously published report on the formation of these compounds. These data may be useful to workers on portland cement hydration, boiler scale, etc., for the identification of phases. 4 p. 5c.

RP1561. Structure of the wool fiber as revealed by the electron microscope. Charles W. Hock and Howard F. McMurdie.

An investigation of the wool fiber with the electron microscope was undertaken in order to get more data on the structure of the fiber and its constituent cells, and to correlate this information with results previously obtained by other methods. Specimens were prepared for examination by various physical and chemical procedures.

Over a wide range of magnifications the cortical cells always showed a distinctly fibrous structure, whereas with the optical microscope only fibrils were observed within the cortical cells, the higher resolving power of the electron microscope made possible the resolution of still finer microfibrils. The scale cells, on the other hand, showed little internal organizations. This difference in structure between the fibrous cortex and the nonfibrous or amorphous cuticle is believed to be of fundamental importance in interpreting many of the properties of the fibers. 8 p. 10c.

RP1562. A friction meter for determining the coefficient of kinetic friction of fabrics. Edwin C. Dreby.

A friction meter is described, and its application to the evaluation of the smoothness of a wide variety of fabrics is discussed. The ruggedness, sensitivity, and ease of operation of the instrument make it suitable for the routine testing of fabrics, the evaluation of finishing agents, and the control of finishing processes. 10 p. 5c.

RP1563. Abrasion and solution of teeth. Wilmer Souder and Irl C. Schoonover.

Minute changes in the surfaces of teeth are detected by observing the injury to calibrated indentation marks made in these surfaces by a diamond hardness indenter. Abrasive and chemical injuries are disclosed by observing or photographing a series of these marks, so placed that each small area is definitely identifiable.

Objectionable abrasives in dentifrices are readily detected by brushing a tooth surface on which indentations have been placed.

The indentations also give an indication of the hardness of the tooth and enable the investigator to select areas of known hardness for experimental tests.

Some data are presented to show the initial effects of chemical solutions and bacterial actions, which may play important roles in the development of dental caries. Eleven figures and two tables correlate the experimental work. 7 p. 10c.

RP1564. Report on the systems lead oxide-alumina and lead oxide-alumina-silica. R. F. Geller and E. N. Bunting.

Phase relations were studied for those portions of the binary and the ternary systems containing over 50 percent of PbO . It is reasonably certain that the binary system contains the compound $\text{PbO} \cdot \text{Al}_2\text{O}_3$. In the ternary system 3 compounds ($8\text{PbO} \cdot \text{Al}_2\text{O}_3 \cdot 4\text{SiO}_2$, $4\text{PbO} \cdot \text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$, and $6\text{PbO} \cdot \text{Al}_2\text{O}_3 \cdot 6\text{SiO}_2$) were identified, 4 others were indicated by optical and X-ray properties, and 10 quintuple points, which include 6 eutectics, were established. Also, Al_2O_3 (99.9 plus purity) was observed to melt at $2,035^\circ \text{C}$. 16 p. 10c.

RP1565. Color designations for lights. Kenneth L. Kelly.

An extension of the ISCC-NBS (Inter-Society Color Council-National Bureau of Standards) system of color names for the description of the colors of drugs and medicines, has been made for describing the colors of lights. The color names consist of hue names, such as red, pink, yellowish green, or purple, without further modifiers, since they are intended to differentiate lights chiefly according to hue. The hue names are among those used in the ISCC-NBS system and carry the same meaning. The chromaticity ranges identified by each of these hue names are defined by areas on the ICI chromaticity diagram. Comparisons are made between the centers of the proposed hue-name ranges and similar values by other authorities, and with the standard colors recognized in various specifications for marine, railway, aviation, and traffic signal colors. 8 p. 5c.

RP1566. Iron as a tanning agent. Joseph R. Kanagy and Ruth A. Kronstadt.

Lactic, citric, hydroxyacetic, and gluconic acids were found satisfactory for stabilizing iron solutions to be used for tanning leather. The influence of pH and concentration on the combination of iron (Fe_2O_3) with standard hide powder was investigated. The maximum fixation of 23 to 25 percent of ferric oxide occurs in the pH range 3.5 to 4.0. Practical tanning experiments were made with goat- and calf-skins. The shrinkage temperatures of the iron-tanned leathers are lower than those of well-tanned chrome leathers. The results of accelerated aging tests indicate that all of the iron-tanned leathers tested had at least fair aging qualities except where gluconic acid was used. The use of iron salts for replacing those of chromium in the tanning of leather shows most promise where citric acid is used for stabilizing the solutions. 11 p. 5c.

RP1567. pH values of acid-salt mixtures of some aromatic sulfonic acids at various temperatures and a criterion of completeness of dissociation. Walter J. Hamer, Gladys D. Pinching, and S. F. Acree.

A method is described to differentiate between completely and incompletely dissociated acids by means of measurements of the emf of galvanic cells without liquid junctions. Hydrogen and silver-silver-chloride electrodes and solutions of the acid, its sodium or potassium salt, and sodium or potassium chloride are used. The activity coefficients of hydrochloric acid in such mixtures are calculated by the equation relating the emf to the activity of hydrochloric acid in known concentrations of the acid and salts. If the mean values of the activity coefficient of hydrochloric acid in the mixtures are higher than those predicted by the limiting law of Debye and Hückel, the acid is then considered to be completely dissociated. If they are lower, the acid is incompletely dissociated. By this method it was found that the sulfonic acid group in *p*-phenolsulfonic and 4-chlorophenol-2-sulfonic acids may be regarded as completely dissociated into sulfonate and hydrogen ions at temperatures of 10° , 25° , 40° , and 60°C .

Solutions containing *p*-phenolsulfonic acid, its sodium or potassium salt, and sodium or potassium chloride and solutions containing 4-chlorophenol-2-sulfonic acid, its sodium salt, and sodium chloride are suitable for use as pH standards. Their pH values range from 1.2 to 2.5 and vary only slightly with temperature changes. Directions for their preparation are given.

The significance of the complete dissociation of the sulfonic acid group in the calculation of the ionization constants and pH values of sulfonate buffers and indicators is discussed in terms of the tautomeric relations and the theory of color changes of indicators. 14 p. 5c.

RP1568. Axial rigidity of perforated structural members. Martin Greenspan.

Formulas are derived for computing the over-all lengthening (or shortening) of a tension (or compression) member having a uniform gross cross section and a series

of similar perforations of circular, elliptical, or "ovaloid" shape uniformly distributed along the length.

Tests made on strips having circular perforations show that the applicable formula gives good results over the practical range of the variables. 18 p. 10c.

RP1569. Basic ionization constant of metacresolsulfonphthalein; pH values and salt effects. Elizabeth E. Sager, Harry J. Keegan, and S. F. Acree.

Spectral transmittancy values at room temperatures approximating 25° C were obtained for 1.25×10^{-5} M metacresolsulfonphthalein in water and in 0.001- to 8-M hydrochloric acid. In water the indicator exists in the yellow form (Y), and hydrogen ions (H) from acids convert it into the red form (R). The molar concentrations of each form of the indicator in various concentrations of hydrochloric acid were computed from the spectrophotometric data. The dissociation constant (K_b) for the reaction of the indicator with hydrochloric acid is given by the equation

$$K_b = M_{\text{HfH}}M_{\text{YfY}}/M_{\text{RfR}},$$

in which M and f , with appropriate subscripts, represent the molarities and activity coefficients, respectively. The value of K_b is 1.98×10^{-2} and that of $-\log K_b$ or pK_b is 1.703 ± 0.005 . The indicator is useful over the pH range 0 to 3. 21 p. 10c. Title page and contents for volume 31. 6 p. 5c.

RESEARCH PAPERS FROM JOURNAL OF RESEARCH OF THE NATIONAL BUREAU OF STANDARDS, VOLUME 32, JANUARY—JUNE 1944

RP1570. Dicalcium silicate solid solutions. Kenneth T. Greene.

Studies on the manner of combination of Na_2O in portland cement clinker have revealed crystalline phases of chemical composition near that of $2\text{CaO} \cdot \text{SiO}_2$, but possessing properties quite different from those heretofore reported for the β form of this compound. These phases result when certain compositions in the quaternary systems $\text{Na}_2\text{O}-\text{CaO}-\text{Al}_2\text{O}_3-\text{SiO}_2$ and $\text{Na}_2\text{O}-\text{CaO}-\text{Fe}_2\text{O}_3-\text{SiO}_2$ are quenched from high temperatures. Optical, thermal, and X-ray diffraction data have been obtained which indicate that they are solid solutions of Na_2O and Al_2O_3 and of Na_2O and Fe_2O_3 , in a high-temperature form of $2\text{CaO} \cdot \text{SiO}_2$ having a hexagonal structure. There is also evidence that this hexagonal lattice is the fundamental structure of the α form of $2\text{CaO} \cdot \text{SiO}_2$.

In the pure compound the α - β inversion temperature has been reported to be $1,420^\circ \pm 2^\circ \text{C}$, whereas in the phases described in this paper the transformation temperature may be lowered by as much as 245°C , e. g., to $1,175^\circ \pm 10^\circ \text{C}$. The inversion from α to β is accompanied by considerable ex-solution of dissolved material, showing that the extent of solid solution of these oxides in β - $2\text{CaO} \cdot \text{SiO}_2$ is much less than in the α form. As a result of this precipitation the grains of β $2\text{CaO} \cdot \text{SiO}_2$ are more or less densely clouded, closely resembling the grains of $2\text{CaO} \cdot \text{SiO}_2$ in some commercial clinkers. The data also indicate that the complex twinning structure often observed in $2\text{CaO} \cdot \text{SiO}_2$ in portland cement clinker and in experimental preparations is the result of inversion from the α to the β phase, and is not typical of the α modification, as some investigators have believed. 10 p. 10c.

RP1571. Hydrocarbons in the gasoline fraction of seven representative crudes, including all the distillate to 102°C and the aromatic to 160°C . Alphonse F. Forziati, Charles B. Willingham, Beveridge J. Mair, and Frederick D. Rossini.

This paper is the second report of an investigation on the analysis of the gasoline fraction of representative crude petroleums by the API Research Project 6 at the National Bureau of Standards. The samples for analysis were selected so as to cover the largest possible range in composition; included one high in aromatics, one high in isoparaffins, one high in normal paraffins, and one high in naphthenes (cycloparaffins); and came from the following fields: Ponca, Okla.; East Texas; Bradford, Pa.; Greendale-Kawkawlin, Mich.; Winkler, Tex.; Midway, Calif.; Conroe, Tex. The fractionating processes of adsorption and distillation were used in the analysis.

Data are given on the amounts of the individual hydrocarbons (paraffins and naphthenes, 40° to 102°C , and aromatics to 160°C) in the gasoline fraction of the seven naphthas. A number of conclusions have been drawn from the data. 27 p. 10c.

RP1572. Measurement of the refractive index and dispersion of optical glass for control of product. Helen L. Gurewitz and Leroy W. Tilton.

Commercial critical-angle refractometers are inadequate for acceptance tests on optical glass for precision uses. To facilitate spectrometer determinations, coefficients have been devised which, together with a table of natural sines and slide-

rule operations, permit the computation of refractive indices of glass with an accuracy of $\pm 3 \times 10^{-6}$ from minimum-deviation data taken on prisms having angles of $60^\circ \pm 30'$. 6 p. 5c.

RP1573. Interpretation of some reactions in the carbohydrate field in terms of consecutive electron displacement. Horace S. Isbell.

An attempt has been made to show how the concept of consecutive electron displacement that has been developed in recent years may be used for the interpretation of certain reactions in the carbohydrate field. The viewpoint in general is that the peculiar properties of systems involving double bonds may be explained by the migration of electron pairs in the molecule from points of high electron density to points of lower electron density, with the addition and elimination of ions. A number of apparently unrelated complex reactions of the carbohydrates are considered and it is shown that the formation of the products may be explained by a few simple reactions involving shifts of electron pairs; these include enolization, de-enolization and double decomposition. Mechanisms are presented for the formation of the four classes of saccharinic acids from the 1,2- the 2,3-, and the 3,4-enediols, for the formation of diacetylkojic acid from acetylglucosone, for the formation of unsaturated lactones from hydroxy acids, for the conversion of triacetylglucal to diacetylpsudoglucal, for the conversion of tetramethyl-1, 2-glucoseen to ω -methoxymethylfurfural, and for the formation of furfural and levulinic acid. 15 p. 5c.

RP1574. Measuring the rate of wear of tire treads. Frank L. Roth and William L. Holt.

The rates of wear of different tread materials were determined by weighing tires after running them prescribed distances on the roads. The method proved feasible for passenger car tires, involved a minimum amount of work, and yielded data in a few miles of driving which could be used to predict the life of the tread. This paper presents typical results obtained on five different tread materials, including prewar natural rubber treads. The rate of wear of the least resistant tread material was eight times that of the most resistant material. 5 p. 5c.

RP1575. A precision apparatus for the rapid determination of indices of refraction and dispersion by immersion. Conrad A. Faick and Bernard Fonoroff.

A new immersion method for determining indices of refraction and ν values, employing the double-diaphragm method for securing oblique illumination, is described. The average error in the determination of indices of refraction based upon 144 measurements is 2×10^{-5} ; the maximum error is 5×10^{-5} . Complete measurements of the indices of refraction for the sodium *D* line and the hydrogen *F* and *C* lines may be made in approximately $1\frac{1}{2}$ hours, and from these measurements the ν values may be calculated with an average error of 0.1 and a maximum error of 0.8. 9 p. 10c.

RP1576. Salts of galacturonic acid and their application to the preparation of galacturonic acid from pectic substances. Horace S. Isbell and Harriet L. Frush.

Twelve new salts of galacturonic acid have been prepared and their properties investigated. Crystalline sodium, potassium, ammonium, cadmium, and silver galacturonates have been found to contain the beta pyranose modification, and crystalline calcium and strontium galacturonates, the alpha modification. A unique type of double salt containing a monovalent and a divalent metal in combination with the alpha pyranose modification of galacturonic acid has been obtained, and the following members of this class have been crystallized and studied: Sodium calcium, sodium strontium, sodium barium, sodium cadmium, sodium lead, and potassium calcium galacturonates. Mutarotation studies have been conducted in order to determine the structure of the galacturonate component in the salts. The crystallizing properties of the normal calcium and strontium galacturonates, and especially of the sodium calcium and sodium strontium galacturonates, makes these salts particularly suitable for the separation of galacturonic acid from the hydrolytic liquors of plant materials. 18 p. 10c.

RP1577. Note on the macroanalysis of carbon and hydrogen by combustion. Donald D. Wagman and Frederick D. Rossini.

This note describes the present state of the development of an analytical combustion apparatus for the accurate determination, on a macro scale, of carbon and hydrogen in hydrocarbons or in compounds containing carbon, hydrogen, and oxygen. The precision and accuracy attainable are indicated by a report of the results of a series of five experiments performed on highly purified benzoic acid. 6 p.

RP1578. Thermal expansion of concrete aggregate materials. Walter H. Johnson and Willard H. Parsons.

As a part of a study of the properties of concrete aggregates, thermal-expansion determinations were made on 123 specimens of aggregate materials by the optical interferometer method over the temperature range -20° to $+60^{\circ}$ C. Additional measurements were made on crystals of calcite, quartz, and feldspar. The thermal expansivities of most aggregate materials are close to or within the range of expansivities of hardened portland cements. Certain exceptions are pointed out. Crystal orientation, rock texture, and composition are discussed with regard to their effects on the relation of the thermal expansion of aggregates to the durability of concrete. 26 p. 10c.

RP1579. Scale substance of wool. Walter B. Geiger.

Earlier work at this Bureau has shown that wool that has been reduced with thioglycolic acid and then alkylated with ethyl bromide is attacked by pepsin in such a way that the scale material remains intact, whereas the interior of the fiber is completely dissolved. The composition of the scale material so obtained has now been studied. It has been found that it is essentially protein in chemical nature and, although it contains the same amino acids as the whole wool, the proportions of these in the two materials differ; thus, the whole wool used in this work contained 12.2 percent of cystine, 8.6 of arginine, 6.1 of tyrosine, and 9.5 of serine, whereas the scale material contained 20.3, 4.8, 3.3, and 11.2 percent, respectively. 4 p. 5c.

RP1580. Effect of sodium chloride on the pH of *p*-phenolsulfonate buffers from 0° to 60° C. Roger G. Bates and S. F. Acree.

The electromotive forces developed between the hydrogen and silver chloride electrodes of galvanic cells which contained 12 mixtures of potassium *p*-phenolsulfonate, sodium hydroxide, and sodium chloride were measured from 0° to 60° C at intervals of 5 degrees. Sufficient alkali was used to neutralize half of the phenolsulfonate in each solution. The molal ratios of sodium hydroxide to sodium chloride were 10, 4, 2, and 1. The pH of each solution, and of six phenolsulfonate buffers without sodium chloride, was determined. Equations are given to represent the change of pH at each of the 13 temperatures with molality of sodium chloride. It is shown that the ionic strength and pH of unknowns may be obtained approximately, and the usual salt errors largely eliminated, from emf measurements on two portions of the unknown solution to which different amounts of sodium chloride have been added. 13 p. 10c.

RP1581. Thermal expansion of high-silicon cast iron. Peter Hidnert and George Dickson.

This paper gives data on the linear thermal expansion of high-silicon cast iron containing approximately 14 percent of silicon, with 3 percent of molybdenum and without appreciable molybdenum, at various temperatures between 20° and 700° C. Differences between the coefficients of expansion of these high-silicon cast irons were found to be slight. Both high-silicon irons were found to have slightly higher coefficients of expansion than electrolytic iron for temperature ranges between 20° and 300° C, and appreciably higher coefficients for higher temperature ranges. No indication of growth similar to that of ordinary cast iron was observed on heating the high-silicon cast iron to 700° C. 5 p. 5c.

RP1582. Analytical determination of aromatic hydrocarbons by adsorption. Beveridge J. Mair and Alphonse F. Forziati.

A simple method is described for determining the amount of aromatic hydrocarbons in a mixture of hydrocarbons, as in the gasoline fraction of petroleum. The mixture to be analyzed is filtered through a column of solid adsorbent. An aromatic-free filtrate is obtained which contains the paraffin, naphthene, or olefin hydrocarbon which was associated in the original solution with the quantity of aromatic hydrocarbon which has been adsorbed. The concentration of an aromatic hydrocarbon in an unknown solution is determined by means of a calibration curve, established from experiments on known solutions which show the amount of aromatic-free filtrate produced by the standard adsorbent from solutions of various concentrations of the aromatic hydrocarbon. Results of experiments are given for several concentrations of eight binary solutions of an aromatic hydrocarbon with a paraffin or naphthene hydrocarbon and for three concentrations of a solution consisting of an aromatic hydrocarbon with a paraffin and an olefin. These experiments show that, if the temperature is controlled to within 1° C, the amount of aromatic hydrocarbon can be determined with an accuracy corresponding to 0.10 or less in the percentage by volume. A general procedure is given for determining the aromatic hydrocarbons in a "straight-run" gasoline and in a gasoline containing olefins. 14 p.

RP1583. Separation and recovery of aromatic hydrocarbons from paraffins and naphthenes by adsorption. Beveridge J. Mair and Alphonse F. Forziati.

A method is described for separating, by the process of adsorption, the aromatic hydrocarbons from their mixture with paraffin and naphthene (cycloparaffin) hydrocarbons, as in the gasoline or kerosine fractions of petroleum. The mixture is introduced into the top of a column containing an appropriate excess of solid adsorbent. A low-boiling paraffin hydrocarbon, such as pentane, butane, or propane, is then added in sufficient quantity to remove from the column the paraffin and naphthene hydrocarbons but not the aromatic hydrocarbons. The latter are then removed by adding an appropriate desorbing liquid, such as methanol. The paraffins, naphthenes, and pentane are thus obtained as a mixture from which the pentane is easily removed by distillation. The aromatic hydrocarbons are obtained as a mixture with pentane and methanol. The methanol is easily removed by extraction with water and the pentane by distillation.

This method of separation was tested on a known mixture of 17 pure hydrocarbons, the normal boiling points of which covered a range from 60° to 174° C and included all of the 5 normal paraffins from *n*-hexane through *n*-decane, the isoparaffin 2-methylpentane, the 4 normal alkyl cyclohexanes from cyclohexane through *n*-propylcyclohexane, and all of the 7 possible aromatic hydrocarbons and benzene through isopropylbenzene. The separation of the aromatic hydrocarbons from the paraffins and naphthenes was quantitative within the limits of measurement, and their recovery was complete within the normal operating loss of material in processing.

Experimental determinations were made of the quantity of aromatic hydrocarbon adsorbed per unit quantity of adsorbent, for a number of different binary solutions of aromatic hydrocarbons with paraffins or naphthenes, at several concentrations of the aromatic hydrocarbon, and with silica gel, carbon, magnesia, alumina, Filtrol, and Florisil as adsorbents. The results are displayed in the form of adsorption isotherms. 19 p.

RP1584. Method for determining individual hydrocarbons in mixtures of hydrocarbons by measurement of freezing points. Anton J. Streiff and Frederick D. Rossini.

A method is described for determining individual hydrocarbons in mixtures of hydrocarbons by the measurement of freezing points. Experimental data are given for the determination of the four C₈ aromatic hydrocarbons. The uncertainty of the determination of each hydrocarbon is near ± 1 percent of the total sample. 11 p.

RP1585. Theoretical analysis of certain time-temperature freezing and melting curves as applied to hydrocarbons. William J. Taylor and Frederick D. Rossini.

A method is described for determining analytically or graphically, from appropriate time-temperature freezing and melting curves obtained on hydrocarbons, the freezing point of a given substance, and within certain wide limits, the freezing point of that substance for zero impurity (liquid-soluble, solid-insoluble). 17 p.

RP1586. A method for the determination of the pH of 0.05-molal solutions of acid potassium phthalate with or without potassium chloride. Walter J. Hamer and S. F. Acree.

The pH values of a 0.05-*m* solution of acid potassium phthalate containing various amounts of potassium chloride were determined at 5-degree intervals from 0° to 60° C, inclusive, from the measurements of the electromotive force of galvanic cells without liquid junction using hydrogen and silver-silver-chloride electrodes. A method is described for the determination of the pH directly from the emf by means of the equation

$$\text{pH} = [(E - E^\circ)/(RT/F) + \log m_{\text{Cl}} - P]/Q,$$

where *P* and *Q* are constants whose numerical values depend on the ionic strength of the solution and the nature of the cation and *E*°, *R*, *T*, and *F* have their usual significance. By this method a 0.05-*m* solution of acid potassium phthalate, National Bureau of Standards Standard Sample 84a, is found to have a pH of 4.008 at 25° C, and this value does not vary much with the temperature. A description is also given of the application of the method to the determination of the pH and the ionic strength of unknown solutions of low salt content.

Equations were formulated to express the variation of the pH of a 0.05-*m* solution of acid potassium phthalate with temperature and with the concentration of potassium chloride. The pH values may be computed for temperatures from 0° to 60° C, inclusive, by the equation.

$$\text{pH} = 5.13 \log T + 1519.62/T + 0.01092 T - 17.039,$$

where $T = t^{\circ}\text{C} + 273.16$. The pH values for concentrations of potassium chloride from 0 to 0.05 m may be computed by the equation.

$$\text{pH}_{\text{with salt}} = \text{pH}_{\text{without salt}} - 0.993m_{\text{KCl}} + 2.124m_{\text{KCl}}^2.$$

The solutions may be readily prepared from known weights of acid potassium phthalate, potassium chloride, and distilled water and are well suited for use as pH standards, in that their pH values do not change much with temperature or dilution. 13 p. 5c.

RP1587. Thermal properties of moist fabrics. Charles W. Hock, Arnold M. Sookne, and Milton Harris.

The "chilling effect", or "clamminess", that moist fabrics produce when in contact with the body was evaluated by subjective tests, by measurement of the drop in temperature that ensued when the moist fabrics were placed on an artificial "skin" surface, and by tests with a moisture-sensitive paper designed to measure the extent of contact which the fabrics made with a surface. Using fabrics of various fiber compositions and constructions, a good qualitative relation was found in these tests. Fabrics which produced considerable chilling in subjective tests were found to make good contact and to cause a substantial drop in skin temperature. Conversely, fabrics which caused little or no clamminess made poor contact and the accompanying drop in temperature was relatively small. The results of these experiments show clearly the progressive improvement of the fabrics with respect to chilling, as their wool content is increased, and also the superiority of certain types of construction that minimize the extent of contact of the fabrics with the skin. 24 p.

RP1588. Purification of substances by slow fractional freezing. Frank W. Schwab and Edward Wichers.

This paper describes two technics for purifying substances by slow fractional freezing.

The first involves the slow lowering of a cylindrical cell, filled with the fused substance, through a heating coil in such a way that freezing begins at the bottom and progresses upward, as the cell emerges from the coil, until the whole mass has solidified. The solidified column, tube and all, is cut into the desired fractions.

The second technic, which is suitable for larger quantities, affords better control of the rate of freezing and provides a larger solid-liquid surface for a given quantity of material. A spherical flask filled with the liquid is cooled at a controlled rate in such a way that freezing begins at the wall of the flask and proceeds inward at a regulated slow rate until the desired fraction has solidified, after which the remaining liquid is siphoned out of the flask.

The purification of benzoic acid was much more rapid by this method than in earlier trials by crystallization from solvents. Acetanilide was also effectively purified. Observations incidental to the work show that the freezing point of pure acetanilide is $114.29 \pm 0.01^{\circ}\text{C}$. 7 p. 5c.

RP1589. A study of the properties of household blankets. Herbert F. Schiefer, Hazel Tharp Stevens, Pauline Beery Mack, and Paul M. Boyland.

The fiber composition, weight, thickness, compressibility, compressional resilience, thermal transmission, air permeability, breaking strength, and shrinkage of 156 different blankets are recorded. The effects of laundering; of laundering and renapping; of laundering, renapping, and abrasion; of dry cleaning and renapping; and of dry cleaning, renapping, and abrasion on these properties of a large number of blankets are shown. A linear relationship was found between the compressional resilience and the wool content of cotton-wool blankets. The thermal transmission of the blankets was found to be independent of the kind of fiber. The reciprocal of thermal transmission was found to be related linearly to the thickness. The thermal transmission computed by means of the equation $1/T = 3.0 t_{0.1} + 0.63$, where T is the thermal transmission in Btu/($^{\circ}\text{F hr 1 ft}^2$), and $t_{0.1}$ is the thickness in inches at a pressure of 0.10 lb/in.², was found to agree with the measured values within ± 10 percent, 95 times out of 100. Empirical relationships were also found among thermal transmission, thickness at 1.0 lb/in.², and compressibility; and among thickness at 0.10 lb/in.², compressibility, and weight. The relation between breaking strength and weight, and that between breaking strength and compressibility, are discussed. Minimum requirements are suggested for the properties of blankets for use in a performance specification. 24 p. 15c.

RP1590. Studies of portions of the quaternary system soda-lime-silica-water at 25° C.
George L. Kalousek.

A study has been made of portions of the system soda-lime-silica-water at 25° C. The only solid phases found were $\text{Ca}(\text{OH})_2$ and a four-component gel of variable composition. The boundary, $\text{Ca}(\text{OH})_2$ — soda-lime-silicate gels, was determined and the compositions of the gels along this boundary shown to vary from 0.003- $\text{Na}_2\text{O} : 2.0\text{CaO} : 1.0\text{SiO}_2 : x\text{H}_2\text{O}$ (at 0.2 g of Na_2O per liter) to about 0.25 $\text{Na}_2\text{O} : 1.0\text{CaO} : 1.0\text{SiO}_2 : x\text{H}_2\text{O}$ (at 20 g per liter and extending to 101 g per liter of Na_2O). In regions off the boundary, at selected constant concentrations of Na_2O but with increasing concentrations of SiO_2 in solution, the $\text{Na}_2\text{O} : \text{SiO}_2$ molar ratio of the gels varied only slightly from 0.2 in most cases; the $\text{CaO} : \text{SiO}_2$ molar ratio, however, decreased to values approaching 0.1 at the maximum concentrations of SiO_2 used. Interpretations pertaining to relations between the composition of the gels and solutions are given. 18 p. 10c.

RP1591. Laminar flow at the interface of two liquids. Garbis H. Keulegan.

The velocity distribution in the laminar boundary layers at the interface of two liquids in relative rectilinear motion, the thickness of the layers, and the stress at the interface are determined. Numerical results are given for nine cases of liquids in contact, including identical liquids and liquids with varying degrees of dissimilarity in characteristics. The evaluation of the desired quantities is based on Prandtl's boundary-layer theory, and is carried out by a method of successive approximations. The numerical results are those given by the second approximation. 25 p. 10c.

Title page and contents for volume 32. 6 p. 5c.

RESEARCH PAPERS FROM JOURNAL OF RESEARCH OF THE NATIONAL BUREAU OF
STANDARDS, VOLUME 33, JULY—DECEMBER 1944

RP1592. Thermodynamic properties of *cis*-2-butene from 15° to 1,500°K.

Russell B. Scott, W. Julian Ferguson, and Ferdinand G. Brickwedde

The following properties of a sample of *cis*-2-butene, 99.94 percent pure, were measured: (1) the specific heat of solid and of liquid from 15° to 300°K, (2) heat of fusion at the triple point (130.25 int. joule g^{-1}), (3) triple-point temperature ($-138.900 \pm 0.008^\circ\text{C}$), (4) heats of vaporization at several temperatures between 246° and 293°K, and (5) vapor pressure from 200° to 296°K. With these experimental data, calculations were made of (1) the normal boiling temperature (3.718°C), (2) volume of the saturated vapor, (3) enthalpy and entropy of the solid and the liquid from 0° to 300°K, and (4) entropy, enthalpy, and specific heat of the vapor in the ideal gas state from 245° to 300°K. Thermodynamic functions for *cis*-2-butene in the ideal gas state from 300° to 1,500°K were calculated from spectroscopic data. Thermodynamic data for the *cis-trans* isomerization of 2-butene are included. 20 p. 10c.

RP1593. A daily record of ultraviolet solar and sky radiation in Washington, 1941 to 1943. W. W. Coblentz and R. Stair

A description is given of a photoelectric ultraviolet-intensity meter and automatic integrating and recording apparatus for measuring the biologically effective component of ultraviolet radiation, of wavelengths 3132 Å and shorter, from the sun and the entire sky, incident on a horizontal plane, under various meteorological conditions. Methods of standardization, in absolute value, are described (see RP1542 for supplementary data). A continuous graphical record of the integrated daily total amount of biologically effective ultraviolet solar and sky radiation observed during a period of 3 years (1941 to 1943) in Washington, D. C. is given. The monthly totals of biologically effective ultraviolet, in absolute value (milliwatt minutes per square centimeter) mw min/cm^2 are also given graphically. On the clearest days the biologically effective component of ultraviolet radiation of wavelengths 3132 Å and shorter, incident from the sun and the whole sky at midday, ranges from about 180 microwatts per square centimeter, ($\mu\text{w/cm}^2$) in midsummer to about 30 $\mu\text{w/cm}^2$ in midwinter. A series of erythema tests is given, correlating the physical (radiometric) measurements with the physiological reaction of the untanned skin, which information is of interest in heliotherapy and bioclimatology. 24 p. 10c.

RP1594. Synthesis of vitamin C from pectic substances. Horace S. Isbell

A new process for the preparation of vitamin C from beet pulp and other pectic substances has been developed. The pectic substance is treated with a pectinase, the resulting galacturonic acid is separated in the form of a difficultly soluble salt which is reduced with hydrogen to a salt of L-galactonic acid. The salt is converted to L-galactono-lactone and oxidized to 2-keto-L-galactonic acid, which is lactonized and enolized to yield ascorbic acid (vitamin C). Electronic interpretations are pre-

sented for the conversion of methyl 2-keto-L-galactonate to ascorbic acid by basic catalysts, for the lactonization and enolization of 2-keto-hexonic acids by acid catalysts, and for the formation of furfural and reductic acid from pentoses, galacturonic acid, and ascorbic acid. 17 p. 10c.

RP1595. Specific heat and increases of entropy and enthalpy of the synthetic rubber GR-S from 0° to 330° K.

Robert D. Rands, Jr., W. Julian Ferguson, and John L. Prather

Specific heat measurements were made over the range 12° to 330° K on a sample of synthetic rubber GR-S (Buna S) by means of an adiabatic vacuum-type calorimeter. A Debye specific heat function was used to calculate values below 15° K. At about -61°C the material undergoes a transition of the second order, the specific heat increasing rapidly by about 40 percent. From -50° to +60°C, the specific heat values can be calculated to within 0.1 percent by the equation $C_p = 0.4346 + 7.029 \times 10^{-4} t + 1.156 \times 10^{-6} t^2$ in calories gram⁻¹ degree Kelvin⁻¹. At 25°C the specific heat is 1.894 international joules gram⁻¹ degree Kelvin⁻¹ (0.4528 calorie gram⁻¹ degree Kelvin⁻¹). The increase in entropy from 0° to 298.16° K is calculated to be 1.824 international joules gram⁻¹ degree Kelvin⁻¹ (0.4359 calorie gram⁻¹ degree Kelvin⁻¹). Values of specific heat, and increases of entropy, enthalpy, and free energy are tabulated at 5-degree intervals. The experimental data indicate that values below the transition are dependent upon the thermal history of the sample. This phenomenon, as well as the temperature drifts observed, can be explained on the theory that the transition results from an increasingly slow approach to the equilibrium state at temperatures in the transition region and below. 8 p.

RP1596. Dipole moment and structure of trioxane. Arthur A. Maryott and S. F. Acree

Trioxane is a solid polymer of formaldehyde resembling the well-known solvent dioxane in its chemical properties. The molecule can possibly exist in two spatially different forms resembling a chair and a cradle, for which the theoretical dipole moments are 2.3 and 0.6×10^{-18} electrostatic unit (esu), respectively. The experimental value in benzene was found to be 2.18×10^{-18} esu. Hence it is concluded that ordinary trioxane is largely in the chair form, possibly in equilibrium with a small amount of the cradle form. This cyclic ether would therefore be suitable for mixing with nonpolar solvents to study the effect of increased polarity on the activities and absorption spectra of indicators. 4 p. 5c.

RP1597. Interferometer measurements on the expansion of iron. James B. Saunders

The interferometer has been applied by many investigators to the measurement of thermal expansion but has failed to yield the precision that they apparently expected and sometimes have claimed. In their explanation of the resultant discrepancies, most observers have attributed them to actual differences in the physical properties of the sample; however, some have admitted failure to find a satisfactory explanation.

Several sets of data, taken on relatively pure iron by different observers and different procedures, are compared. The results show good agreement between data taken with those interferometer methods that are free from tilting of spacers and air-film errors, whereas the failure to eliminate these two errors produces data that cannot be duplicated except by chance. The interferometer data that are free from these errors also agree satisfactorily with data that have been obtained by other precision methods.

Some investigators claim to have found indications of a characteristic temperature effect in the expansivity curve of iron in the temperature range from 0° to 250°C. It is shown that when the expansion data are freed from errors of tilting and changes in air films, the indications of such effects do not appear. 9 p. 10c.

RP1598. A comparison of platinum and palladium hydrogen-electrodes in aqueous solutions of acid potassium phthalate. Walter J. Hamer and S. F. Acree

A study was made of the reproducibility of hydrogen electrodes of various types and of silver-silver-chloride electrodes of the thermal-electrolytic type in aqueous solutions of phthalates, in order to learn whether phthalates are reduced to hexahydrophthalic acid and the electromotive force thereby changed. If so, glass electrodes would have to be used to determine the pH values of solutions of phthalates. This type of study is necessary for all reducible materials. Electromotive-force measurements of the electrode combinations were made for various periods of time. The potentials of hydrogen electrodes prepared with platinum sponge under a variety of conditions constantly increased with time and frequently were erratic, whereas those made with palladium sponge under different conditions remained remarkably constant for periods of 35 hours. Even after 75 hours, the potentials increased only 0.3

mv—which corresponds to an increase of only 0.005 in pH. Palladium or platinum electrodes having the same type of coating but of different ages agreed in potential after 2 hours in phthalate solutions. The rate and the magnitude of the increase in potential for the platinum electrodes after approximately 2 hours depend mainly upon the thickness of the metallic sponge. The characteristics of the palladium electrodes were practically independent of the thickness of the metallic sponge; of the current density used in the electrolysis; of the concentration, composition, acidity, and conductance of the plating solution; and of the concentration, composition, pH, and buffer capacity of the phthalate solutions in which the electrodes were used. The difference in the behavior of platinum and palladium hydrogen-electrodes may be caused by their different catalytic activity. 17 p. 10c.

RP1599. Extent of hydrolysis of starches by amylases in the presence and absence of yeasts William Ward Pigman

The extent of enzymic conversion of corn starch, waxy maize starch, and potato amylose into materials fermentable by yeasts was studied for a number of different types of amylases. When the amylases are allowed to act on the starch substances, complete conversion to fermentable material may take place when the yeasts are allowed to act in the presence of the enzymes but not when the amylases and yeast act separately. The amylases that are capable of bringing about complete conversion are the cereal α -amylases and the fungal amylases. Certain bacterial amylases, pancreatic amylases, and the cereal β -amylases convert starch only partially to fermentable substances in the presence of yeasts. The experiments described in the present paper were carried out at starch concentrations comparable to those employed in industrial grain-alcohol processes.

With the notable exception of the malt amylases and the β -amylases, all of the enzyme preparations studied are capable of synthesizing unfermentable substances from maltose and presumably from starch hydrolysis products. For certain of the enzyme preparations, this synthesizing action provides an explanation for the lack of complete conversion of the starches to fermentable materials. For other enzymes, however, other explanations are more probable. The nature of the actions of the amylases are considered in relation to the structures of the starch substances.

Improved procedures are given for the preparation of soybean β -amylase and of potato amylose. Methods are described for bringing starches into solution without preliminary gel formation. 12 p. 5c.

RP1600. A physical method for determining residual water and other volatile materials in pure substances. Frank W. Schwab and Edward Wichers

A method is described for determining small amounts of water and other volatile substances present as impurities in various organic and inorganic compounds. The impurity is separated by fusing the substance in a cell attached to a collecting system and allowing it to freeze slowly while the vapors are collected by pumping them into a trap of known volume, cooled by liquid air. When the trap is warmed to room temperature, the pressure of the vapor within it, if below saturation, together with the temperature and volume, determine the quantity of impurity in terms of moles and if its identity is known, in terms of weight. An auxiliary procedure permits the impurity to be isolated as a liquid, in a capillary container, and thus to be identified.

It was found that the current Standard Samples of benzoic acid (39f and 140) contains less than 0.002 percent of water and do not adsorb water on exposure to an atmosphere of high humidity. The method is further illustrated by the determination of residual solvents in acetanilide crystallized from benzene and from a mixture of alcohol and water, and of water present in potassium dichromate as entrapped mother liquor. 8 p. 5c.

RP1601. Optical rotation as an indication of aromatic substituent influences and intramolecular interaction. William Ward Pigman

As a result of a comparison of the rotations of certain aromatic β -glucosides and their tetraacetates, it is shown to be probable that the rotations of the acetylated glucosides are influenced by steric interactions between the aglycon group and the sugar portion of the molecule. This behavior is in contrast to the influences predominating in the case of the unacetylated compounds which, as shown in previous work, probably operate on the resonance of the aglycon aromatic ring or in an inductive fashion.

As a test for the explanation of the anomalous positive rotations of certain of the acetylated β -glucosides, the rotation of several of these substances in nitrobenzene solution was measured over the temperature interval 20° to 150°C. Over this temperature range, several of the glucosides, and in particular those which

show anomalous positive rotations at room temperature, exhibit a change in sign of rotation from positive to negative.

The preparation and properties of the following new compounds are described: The *m*-nitrophenyl α -D-glucoside and its tetraacetate, the *o,p*- and *o,o'*-dinitrophenyl β -glucoside tetraacetates, and the *m*-nitrobenzyl β -glucoside tetraacetate. The rotatory dispersion of these and other glucosides is reported for five wavelengths over the visible spectrum. 16 p. 5c.

RP1602. Soil-corrosion studies, 1941: Ferrous and non-ferrous corrosion-resistant materials and nonbituminous coatings.

Kirk H. Logan and Melvin Romanoff

The soil-corrosion investigation started in 1922 was intended to yield information on the corrosiveness of typical soils throughout the United States. The investigation of special materials and coatings begun 10 years later was intended primarily to assist manufacturers in the development of materials suitable for use in corrosive soils.

No attempt to secure specimens such that systematic data on the effect of individual alloying elements could be obtained was made but, manufacturers were invited to submit materials on which they desired information. Furthermore, the specimens were buried under simulated practical conditions, so that accurate technical control was not feasible. Also, since very few specimens of each type were included, dispersion of the data resulting from the general conditions of the tests makes it impossible to draw very definite conclusions with regard to the comparative merits of the several materials investigated. Nevertheless, the data give a general indication of what may be expected of a considerable variety of alloys when exposed to severe soil conditions. The addition of very small percentages of alloying elements does not have a marked effect on the rate of corrosion, but rather large percentages are apt to bring about a considerable improvement in corrosion resistance.

Steels high in nickel and chromium, and copper alloys high in copper are very resistant to nearly all soil conditions. Lead corrodes only slightly when a coating of an insoluble lead salt is deposited on the lead.

Bursting and crushing tests indicate that asbestos-cement pipe gained somewhat in strength from exposure to the soil for 4 years.

A 3-ounce coating of zinc adds about 3 years to the life of steel exposed to some of the most corrosive soils in the test sites. Lead coatings appear to be inadequate for severe soil conditions.

Several thick experimental coatings prevented practically all corrosion at most of the test sites for 9 years. Air-dried Bakelite coatings blistered within 4 years, but a baked-on Bakelite coating showed no change in appearance after 4 years except for a few blisters. Pitting occurred under some of these blisters. Most thin coatings blistered, became brittle, and within 4 years permitted rusting and pitting of the metal to which they were applied. 52 p.

RP1603. Revised results obtained with certain dehydrating agents used for drying gases.....John H. Bower

This paper is a revision of a former paper, and as a result of further study it includes two revised values. New samples of anhydrous magnesium perchlorate, or Amhydrone, silica gel, and alumina were obtained and tested for dehydrating efficiency. The method used was similar to that described in the earlier paper, except that a drying tower replaced the U-tube and each desiccant was tested separately. No change of efficiency value was obtained with anhydrous magnesium perchlorate, but new values for silica gel and alumina were found and replace the values originally given. 2 p.

RP1604. Stress-corrosion tests of bridge-cable wire.....Rolla E. Pollard

Stress-corrosion cracks were produced in several statically stressed specimens of cold-drawn wire from the Portsmouth Bridge and in one specimen of heat-treated wire from the Mt. Hope Bridge by immersion in dilute nitrate solutions. No cracks were produced in the cold-drawn Mt. Hope replacement wire after long exposure. No cracks were produced by immersing similar specimens in more corrosive media such as distilled water or dilute ammonium sulfate or in inhibitive solutions such as dilute ammonium nitrate or dilute sodium hydroxide. The results conform, in this respect, to the selective corrosion theory of intercrystalline attack. However, due to the limited amount of materials and their incompletely known history, the effect of such factors as composition, fabrication and heat treatment of the steel could not be determined. 11 p. 10c.

RP1605. Transformations of the fundamental equations of thermodynamics.

Floyd Buckley

A substitution group for generating families of thermodynamic formulas is derived. The method of derivation is based upon the transformation properties of a "group of functions" under a contact transformation. There exists a characteristic function and a "group of functions" for each representation, that is, each coordinate system, and to each function of the group there is an associated contact transformation which transforms the group into its equivalent in another representation. The invariance of the functional form of the characteristic groups of functions under contact transformations is equivalent to invariance under a substitution group G on the space $(EHFG)(V - S - TP)$. The group G is independent of the representation and can be generated geometrically.

There are four contact transformations (including the identity) associated with each representation. These transformations are equivalent, and from them families of equations can be found which are invariant under the group G . Other families can be found among the transformation formulas for the higher derivatives.

Formulas deducible by simple operations, for example, differentiation, on the characteristic group of functions of a given representation provide basic forms for families invariant under the group G . The number of members in a family is 1, 2, 4, or 8. 21 p.

RP1606. Review of recent absolute determinations of the ohm and the amperes.

Harvey L. Curtie

In the decade preceding 1944 there were published the results of eight determinations of the absolute ohm and seven of the absolute ampere. These determinations were made in the national standardizing laboratories of England, France, Germany, Japan, and the United States. However, only preliminary results of some of the researches have been published, and one value of the absolute ampere was obtained in an experiment that was originally developed for another purpose. Hence to obtain the most probable values of the absolute ohm and ampere, it is necessary to ignore some of the published results and to consider some of those remaining as more reliable than others. A critical analysis has been prepared of each of the determinations, and this analysis has been used as a basis for weighting the results.

The most probable value of the absolute ohm is given by the relation

$$1 \text{ mean international ohm} = 1.000\,490 \text{ absolute ohms.}$$

The mean deviation from the mean of the results used in obtaining this value is only 14 parts per million. Further confirmation of the probability of this result is shown by the agreement with the results of two other recent compilers of the absolute-ohm determinations.

The most probable value of the absolute ampere is given by the relation

$$1 \text{ mean international ampere} = 0.999\,853 \text{ absolute ampere.}$$

The mean deviation from the mean of the three results used in obtaining this value is 3 parts per million. Other recent compilers, however, have given larger values, one, 27 parts per million larger, and the other, 119 parts per million larger. 20 p. 10c.

RP1607. Heats of combustion of eight normal paraffin hydrocarbons in the liquid state.....Edward J. Prosen and Frederick D. Rossini;

The heats of combustion of *n*-pentane, *n*-hexane, *n*-heptane, *n*-octane, *n*-nonane, *n*-decane, *n*-dodecane, and *n*-hexadecane, in the liquid state, were measured with a bomb calorimeter. The samples of hydrocarbon were of known high purity, were inclosed in thin glass bulbs and placed in a platinum cup in the calorimetric bomb with purified oxygen at a pressure of 30 atm, and were ignited electrically with a wire fuse. The amount of reaction in each experiment was determined from the amount of carbon dioxide formed by the combustion. Tests were made for the presence of carbon monoxide and other products of incomplete combustion. The calorimeter system was calibrated with electrical energy.

From the experimental data were calculated the following values for the heat of combustion, at 25° C and constant pressure, of the liquid hydrocarbon in gaseous oxygen to form gaseous carbon dioxide and liquid water, with all the reactants and products in their thermodynamic standard reference states, in int. kj/mole: *n*-pentane, 3508.56 ± 0.77 ; *n*-hexane, 4162.34 ± 0.83 ; *n*-heptane, 4816.35 ± 0.87 ; *n*-octane, 5469.82 ± 1.05 ; *n*-nonane, 6123.90 ± 1.12 ; *n*-decane, 6777.47 ± 1.52 ; *n*-dodecane, 8085.20 ± 1.65 ; *n*-hexadecane, 10699.1 ± 2.8 . The corresponding values in kcal/mole, obtained by using the factor 1/4.1833, are *n*-pentane, 838.71 ± 0.18 ;

n-hexane, 994.99 ± 0.20 ; *n*-heptane, 1151.33 ± 0.21 ; *n*-octane, 1307.54 ± 0.25 ; *n*-nonane, 1463.89 ± 0.27 ; *n*-decane, 1620.13 ± 0.36 ; *n*-dodecane, 1932.73 ± 0.39 ; *n*-hexadecane, 2557.58 ± 0.68 . 18 p. 10c.

RP1608. Liquid-junction potentials, and relative activity coefficients of chloride ions, in concentrated mixed chlorides and nitrates at 25°C.

George G. Manov, Nicholas J. DeLollis, and S. F. Acree

Measurements are reported of the electromotive forces at 25°C of pairs of calomel half-cells in which portions of the saturated potassium chloride had been replaced at constant ionic strength (4.831) by hydrochloric acid and potassium nitrate. The method of cells with liquid junctions was used.

Data are given for the stability of half-cells prepared with these electrolytes, for the reproducibility of the liquid junction and the calculated value of its potential, and for the activity coefficient of the chloride ion in these mixtures relative to that of saturated potassium chloride solution. The addition of hydrochloric acid raises and the addition of potassium nitrate lowers the mean activity coefficient of chloride ion in potassium chloride solutions. Because the difference between the effective ionic mobilities for the cations and the anions in these solutions is smaller than in saturated potassium chloride alone, such cells are useful as reference electrodes in the reduction of the error caused by the neglect of the liquid-junction potential in the determination of pH by electrometric methods. 13 p. 10c.

RP1609. Ionization constant of boric acid and the pH of certain borax-chloride buffer solutions from 0° to 60°C.

George G. Manov, Nicholas J. DeLollis, and S. F. Acree

The ionization constant of boric acid was determined by the use of the electromotive force of cells without liquid junctions. Hydrogen and silver-silver-chloride electrodes were immersed in borax-sodium chloride solutions. To reduce the possibility of formation of polyborates, dilute solutions were used. The emf were measured at 5-degree intervals over the temperature range 0° to 60°C.

The negative common logarithm of the ionization constant (pK) of boric acid over the temperature range 0° to 60°C may be represented by the equation

$$pK = 2237.94/T + 0.016883T - 3.305,$$

where T is the absolute temperature.

The data indicate that the mean activity coefficients of the ions of sodium chloride and of sodium borate do not differ appreciably. The pH values for the solutions studies and for rounded values of the concentration are tabulated as functions of temperature and ionic strength. These solutions, which range in pH values from 8.934 to 9.465, can be used as standards in the calibration of glass-calomel and other electrometric pH equipment.

A discussion is given of the significance of the quantity a_i (commonly called the "distance of closest approach" of the ions) and its importance in the calculation of pH values, especially when the buffer ion is not univalent.

The changes in free energy, heat content, entropy, and heat capacity that accompany the ionization of 1 mole of boric acid are listed. 20 p. 10c.

RP1610. Determination of tin in nonferrous metals by distillation as bromide and precipitation with cupferron.....William D. Mogerman

A gravimetric method is described for the determination of tin in copper-base and lead-base alloys. The procedure involves separation of the tin by distillation, precipitation with cupferron, and ignition to stannic oxide. Results obtained by applying the method to known amounts of tin and to a number of nonferrous alloys show that an accuracy to ± 0.2 mg can be expected for amounts of tin ranging 0.05 to 0.24 g. 8 p. 5c.

RP1611. Machines and methods for testing cordage fibers.....Herbert F. Schiefer

Machines are described for testing the flexural endurance and the resistance to abrasion of cordage fibers. In the test for flexural endurance, a bundle of fibers having a twist of one turn per inch is repeatedly drawn back and forth over three small pulleys located at the vertices of an isosceles right triangle. In the test for resistance to abrasion, a similarly twisted bundle of fibers is drawn back and forth against a second bundle twisted once around the first. This test is made in such a way that the flexing of fibers during the test is reduced to a minimum.

The procedures for the selection of fibers, preparation of fiber bundles weighing 5 grains per 15 inches of length, and conditioning of test specimens are outlined. The unprocessed fibers were tested for the following: Fineness of fiber; dry and wet breaking strength and elongation; flexural endurance; resistance to abrasion; and the

effect of elevated temperatures, continuous soaking in fresh and in salt water, alternate wetting and drying with fresh or salt water, and exposure to light with intermittent spraying with water. The results of tests of six lots of abaca, nine of sisal, two of jute, two of henequen, one of pita floja, one of ixtle, four of sansevieria, one of palmetto, three of hemp, two of roselle, one of manzanita, two of yucca, and one of malvita are given and discussed.

Great variations were found in the characteristics of different lots and grades of one kind of fiber. There was considerable overlapping in results of different kinds. No one kind of fiber was outstanding in all respects. Abaca was the strongest of the fibers tested, but some of the lots of abaca were weaker than some lots of sisal. Henequen and sisal were more resistant to abrasion than the other fibers tested, and they had higher flexural endurance, but were the least resistant to exposure to light and intermittent spraying with water. Pita floja, one of the strongest fibers tested, was one of the least resistant to abrasion. Sansevieria had exceptionally good strength. Hemp and jute were very similar in all of the characteristics measured. The resistance to abrasion of the fibers tested was profoundly affected by the direction of twist in the ply relative to that in the bundle, and also by the addition of a small amount of lubricant. 25 p. 15c.

RP1612. Thermal-density coefficients and hydrometer correction tables for vegetable tanning extracts.....Mary Grace Blair and Elmer L. Peffer

Densities and thermal expansions have been determined of the vegetable tanning extracts — quebracho, oak bark, hemlock bark, chestnut, and mangrove bark — within the range 1.00 to 1.12 specific gravity at 60°/60°F and over the temperature range 50° to 100°F. Thermal-density coefficients are presented in such a manner that the density of an extract at any temperature within the range can be calculated if its specific gravity at 60°/60°F or its density at 25°C is known. The information obtained has been used also in the preparation of tables for correcting hydrometer readings at observed temperatures in degrees barkometer, in degrees Twaddle, and in degrees Baumé to readings at the standard temperature 60°F. 11 p. 5c.

RP1613. Measurement of rate of flow of water through filter paper.

Herman Bogaty and Frederick T. Carson

A method is described for measuring the rate of filtration of water through filter papers, in which the paper is used as a cone in the usual manner and special apparatus is not required. An equation is derived, with which a water-filtration coefficient is determined from the filtration data. Data are presented also to show the effect of continued filtration on this coefficient. A correlation is shown between the air permeability of filter paper and the rate of filtration, enabling one to make a good estimate of the speed of a filter paper without wetting it. A definite procedure is recommended for determining the rate of flow of water through filter paper. 10 p. 5c.

RP1614. Attack of refractory platiniferous materials by acid mixtures at elevated temperatures.

Edward Wichers, William G. Schlecht, and Charles L. Gordon

Iridium and other refractory metals and alloys of the platinum group can be easily prepared for analysis, or for small-scale refining, by solution with hydrochloric acid and suitable oxidants in sealed tubes at temperatures up to 300°C. The effects on the rate of solution of iridium caused by variations in temperature, in concentrations of hydrochloric acid and of the oxidant, and in the nature of the oxidant, are reported. The rate increases rapidly with increase in temperature. It also increases with increasing concentration of hydrochloric acid, up to nearly anhydrous hydrogen chloride. With variation in the concentration of chlorine or equivalent oxidants, the rate passes through a maximum at a relatively low concentration.

A number of other factors of less importance are also discussed. Suitable working conditions for dissolving various alloys and minerals are suggested. 19 p. 10c.

RP1615. Improved reflux regulator and head for laboratory distilling columns.

Charles B. Willingham and Frederick D. Rossini

A reflux regulator and head for laboratory distilling columns is described that is an improvement over the one previously in use (see J. Research N. B. S. 23, 509 (1939) RP1249) in the distillation laboratory at the National Bureau of Standards in connection with the work of the American Petroleum Institute Research Project 6. The improvements are in better measurement of the temperature of the liquid-vapor equilibrium, in reduction of the hold-up, and in increase in the mechanical strength. 5 p.

RP1616. Preparation of salts of galacturonic acid from beet pulp.

Horace S. Isbell and Harriet L. Frush

This investigation demonstrates that dried beet pulp can be hydrolyzed by a commercial pectic enzyme, and that calcium galacturonate, sodium calcium galacturonate, and sodium strontium galacturonate can be obtained readily from the hydrolyzate. The crystalline salts are obtained by neutralization of the hydrolyzate with suitable bases, followed by concentration. Samples of dried beet pulp gave calcium galacturonate, sodium calcium galacturonate, and sodium strontium galacturonate in yields corresponding to 105 g, 227 g, and 255 g/kg, respectively.

It is also shown that sodium strontium galacturonate can be separated, at least in some cases, directly from silage drainage liquor. The occurrence of galacturonic acid in the drainage liquor suggests the possibility of developing a process in which hydrolysis is effected by organisms grown in beet pulp. 12 p. 5c.

RP1617. Preparation of sodium strontium galacturonate from citrus products.

Harriet L. Frush and Horace S. Isbell

The present paper describes the convenient separation of galacturonic acid in the form of sodium strontium galacturonate from the hydrolyzates of citrus products, namely pectic acid, pectin, and the peel of oranges and of grapefruit. The methods are suitable for the preparation of large or small quantities of the salt, and it is believed that the preparation from pectic acid is commercially practicable.

Sodium strontium galacturonate is obtained from pectic acid in about 90-percent yield without the use of alcohol or other organic solvent. By treatment of the salt with an equivalent quantity of aqueous sulfuric acid, a solution is obtained from which about 65 percent of the galacturonic acid may be crystallized in one crop, substantially pure. Additional crops obtained by the use of an organic solvent make the yield nearly quantitative.

Pectin is not quite so satisfactory in the process as pectic acid, but because of its educational value, the preparation of sodium strontium galacturonate from pectin might be included in a course of laboratory instruction to demonstrate the presence of galacturonic acid in pectic substances. Both orange peel and grapefruit peel may be used for the preparation of sodium strontium galacturonate, but the industrial use of these materials does not seem feasible at present on account of the large quantities of relatively expensive enzyme required for hydrolysis. 6 p. 5c.

RP1618. Standard response functions for protanopic and deuteranopic vision.

Deane B. Judd

The color matches set up by the normal observer can be predicted satisfactorily by three functions of wavelength defining the ICI standard observer. It has been found possible by a transformation of coordinate system to express these three functions in a form such that two of the three pairs also represent the color matches of the two recognized types of red-green-blind observer, the protanope and the deuteranope, within the rather small uncertainties to which they are known. The remaining pair of functions represents, within the comparatively large uncertainties to which they are known, the color matches of the tritanope, a more rare type of observer who confuses reddish blue with greenish yellow. These three functions, therefore, serve to relate the color matches made by dichromats to those made by normal trichromats, and so make conveniently accessible the color confusions of average dichromatic observers. The use of these three functions in the solution of problems arising in the design of tests for colorblindness is illustrated by solution of three such problems, and their connection to theories of color vision is discussed. 31 p. 10c.

RP1619. Some experimental data on the heats of combustion of benzoic acid and carbon (graphite).....Edward J. Prosen and Frederick D. Rossini

Some experimental data are reported on the heats of combustion of benzoic acid and carbon (graphite). The data on benzoic acid support the change in the value for its heat of combustion recently reported from this Bureau by Jessup. The data on carbon (graphite) yield a slightly higher value for the heat of formation of carbon dioxide than that previously reported. 8 p. 5c.

RP1620. Heat of formation of carbon dioxide and of the transition of graphite into diamond...Edward J. Prosen, Ralph S. Jessup, and Frederick D. Rossini

A recalculation of data previously reported on the heats of combustion of graphite and diamond, together with consideration of some new data on graphite, yielded the following selected "best" values for the heats of combustion of graphite and diamond and of the transition of graphite into diamond:

$C(c, \text{graphite}) + O_2(\text{gas}) = CO_2(\text{gas}); \Delta H_{298.16}^\circ = -393,447 \pm 45 \text{ int. j/mole} = -94,051.8 \pm 10.8 \text{ cal/mole}$
 $C(c, \text{diamond}) + O_2(\text{gas}) = CO_2(\text{gas}); \Delta H_{298.16}^\circ = -395,343 \pm 96 \text{ int. j/mole} = -94,505.1 \pm 22.9 \text{ cal/mole.}$
 $C(c, \text{graphite}) = C(c, \text{diamond}); \Delta H_{298.16}^\circ = 1896 \pm 85 \text{ int. j/mole} = 453.2 \pm 20.3 \text{ cal/mole.}$ 3 p. 5c.

RP1621. Preparing refractory oxides, silicates, and ceramic materials for analysis, by heating with acids in sealed tubes at elevated temperatures.

Edward Wichers, William G. Schlecht, and Charles L. Gordon

This paper describes the preparation for analysis of a number of refractory oxides, ceramic materials, and minerals by decomposition with hydrochloric or hydriodic acid at temperatures up to 300°C. All the oxides of the elements in the second, third, and fourth groups of the periodic system, with the exception of silica, titania, zirconia, and possibly hafnia, respond to the treatment. A number of silicate minerals, ordinarily difficult to prepare for analysis, are likewise successfully decomposed. 6 p. 5c.

RP1622. Use of sealed tubes for the preparation of acid solutions of samples for analysis, or for small-scale refining; pressures of acids heated above 100°C.

Charles L. Gordon, William G. Schlecht, and Edward Wichers

This paper describes special technics suitable for the use of sealed tubes in treating refractory materials with hydrochloric acid and other acid mixtures at elevated temperatures. Methods for filling, for sealing, and for opening tubes are discussed. The feasibility of reuse of tubes of Pyrex glass is discussed with some observed phenomena of the attack on the glass by the acids. A protecting shell is described together with a method of using solid carbon dioxide to provide the compensating pressures needed to protect the sealed tubes from bursting. The pressures developed on heating hydrochloric acid and mixtures of hydrochloric acid with nitric or perchloric acids were measured in a special gage, which is described. 14 p. 5c.

RP1623. Analogy of hydrated calcium silicoaluminates and hexacalcium aluminate to hydrated calcium sulfoaluminates. . . E. P. Flint and Lansing S. Wells

Two hydrated calcium silicoaluminates were prepared, which appear to be the silica analogs of the hydrated calcium sulfoaluminates. The low-silica compound has the formula, $3CaO \cdot Al_2O_3 \cdot CaSiO_3 \cdot 12H_2O$. It occurs as hexagonal plates, is uniaxial negative, and has the indices of refraction, $\omega = 1.538$, $\epsilon = 1.523$. The other compound occurs as needle-shaped prisms and is uniaxial negative; $\omega = 1.487$, $\epsilon = 1.479$. It was not obtained in pure form but, by analogy with other calcium aluminate complex salts, was tentatively assigned the formula, $3CaO \cdot Al_2O_3 \cdot 3CaSiO_3 \cdot 30-32H_2O$. The low-silica compound is slowly converted to the high-silica silicoaluminate on standing in contact with lime solutions. The high-silica compound was identified in mixtures of $\beta\text{-}2CaO \cdot SiO_2$ and $4CaO \cdot Al_2O_3 \cdot Fe_2O_3$; $\beta\text{-}2CaO \cdot SiO_2$ and $3CaO \cdot Al_2O_3$; and $3CaO \cdot SiO_2$ and $4CaO \cdot Al_2O_3 \cdot Fe_2O_3$ which had stood in contact with approximately saturated lime solution for 3 years. A hydrated hexacalcium aluminate, $6CaO \cdot Al_2O_3 \cdot 33H_2O$, was prepared. It occurs as long, needle-like prisms, is uniaxial negative, and $\omega = 1.475$, $\epsilon = 1.466$. Its formula may be written as $3CaO \cdot Al_2O_3 \cdot 3Ca(OH)_2 \cdot 30H_2O$, which indicates that it is the compound formed when the $CaSO_4$, in the high-sulfate sulfoaluminate is completely replaced by $Ca(OH)_2$. 8 p. 5c.

Title page and contents for volume 33. 6 p. 5c.

RESEARCH PAPERS FROM JOURNAL OF RESEARCH OF THE NATIONAL BUREAU OF STANDARDS, VOLUME 34, JANUARY—JUNE 1945

RP1624. Methods for measuring the coefficient of restitution and the spin of a ball. Lyman J. Briggs

Four methods for measuring the coefficient of restitution of a ball are discussed and employed experimentally. These methods are:

1. The two-pendulum ballistic method of Thomas, in which the ball is struck by a flat-nosed projectile driven from an airgun.

2. A method based on spark photography, by means of which the ratio of the speed of the ball to that of the projectile is determined.

3. The measurement of the vertical rebound of a ball from a massive horizontal plate, when dropped from a known height, correction being made for air resistance.

4. The measurement of the angle of reflection of a ball rebounding from a smooth inclined plate, the angle of incidence being known.

A correction for spin is necessary in method 4 if the plate is not ideally smooth. Methods are described for measuring the spin velocity, and an approximate method for computing the spin is given, provided the coefficient of restitution is known.

The variation of the coefficient of restitution of golf balls with impact speed and with temperature is experimentally determined, and a method for determining the time interval during which the ball remains in contact with the club is described.

The coefficient of restitution of a golf ball when hit hard is roughly 0.7; the corresponding value for a baseball of prewar construction is about 0.45. 23 p. 10c.

RP1625. Evaluation of the finish of a metal surface by a replica method.

Harry K. Herschman

A method for evaluating surface finish through the medium of a nearly transparent plastic replica of a surface is described. The method consists essentially in passing a narrow beam of light transversely through the moving replica onto a photoelectric cell. Variations in the geometric characteristics of the film, which are associated with the serrations of the surface reproduced, control the intensity of the light passing through the film and reaching the photocell at any instant. The fluctuations of intensity of the transmitted light cause a pulsating voltage in the cell circuit, which is recorded by an electronic voltmeter. This voltage increases with increased surface roughness. The evaluations obtained by this means are very promising. Results for different surface finishes are correlated with profile measurements of the surface determined with the microscope. 7 p. 10c.

RP1626. Wearing quality of some vegetable-tanned sole leathers.

Robert B. Hobbs and Ruth A. Kronstadt

The differences between the wearing qualities of vegetable-tanned commercial sole leathers are small, the difference between the best and worst of the 20 tannages studied amounting to less than 16 percent. Additional compression, similar to that given by heavy rolling, improved the wear 5 percent. The test also indicated that there is no significant difference in the wear of leather tanned from domestic and from frigorifico hides; that water-soluble material and grease are lost from soles in service, with the greatest loss being shown by water-soluble ash; that the "rubber" and "leather" abrasive machines are of little use in predicting the relative wearing qualities of tannages; and that the water-soluble content, firmness, and degree of tannage are useful in estimating the wearing quality. These conclusions are based on tests in service of about 500 pairs of soles, mostly at Camp Lee, Va. 19 p. 10c.

RP1627. Frequency meter for use with Geiger-Müller counter.

Leon F. Curtiss and Burrell W. Brown

An improved circuit is described for reading the rate of pulses from a Geiger-Müller counter. Based on the usual procedure of leveling and rectifying the pulses to charge a condenser, the improvements concern a bridge-type vacuum-tube voltmeter to read the voltage on the condenser and an arrangement to compensate parasitic potentials developed in the rectifier for the pulses. An adequate source of potentials from one small transformer is described, which renders the circuit useful in portable instruments. Particular care has been taken to design a circuit that is independent of the voltage of the alternating-current mains from which the circuit is operated. A modification of the circuit for rapidly decaying sources is also described. 6 p. 5c.

RP1628. Heats of formation and combustion of 1,3-butadiene and styrene.

Edward J. Prosen and Frederick D. Rossini

Values are given for the heats of formation from the elements, and for the heats of combustion, of 1,3-butadiene and styrene, in both the liquid and gaseous states, at 25°C. 5 p. 5c.

RP1629. Heats of combustion of benzene, toluene, ethylbenzene, *o*-xylene, *m*-xylene, *p*-xylene, *n*-propylbenzene, and styrene.

Edward J. Prosen, Roger Gilmont, and Frederick D. Rossini

The heats of combustion of benzene, toluene, ethylbenzene, *o*-xylene, *m*-xylene, *p*-xylene, *n*-propylbenzene, and styrene were measured with a bomb calorimeter. The following values were obtained for the heat of combustion, at 25°C and constant pressure, of the liquid hydrocarbon in gaseous oxygen to form gaseous carbon dioxide and liquid water, with all the reactants and products in their thermodynamic standard reference states, in international kilojoules per mole: Benzene, 3267.09 ± 0.43 ; toluene, 3909.31 ± 0.49 ; ethylbenzene, 4564.09 ± 0.72 ; *o*-xylene, 4552.10 ± 1.02 ; *m*-xylene, 4551.10 ± 0.62 ; *p*-xylene, 4552.09 ± 0.91 ; *n*-propylbenzene, 5217.37 ± 0.68 ; styrene 4394.14 ± 0.82 . With the factor $1/4.1833$, the corresponding values in kilocalories per mole are benzene, 780.98 ± 0.10 ; toluene, 934.50 ± 0.12 ; ethylbenzene, 1091.03 ± 0.17 ; *o*-xylene, 1088.16 ± 0.24 ; *m*-xylene, 1087.92 ± 0.15 ; *p*-xylene, 1088.16 ± 0.22 ; *n*-propylbenzene, 1247.19 ± 0.16 ; styrene, 1050.40 ± 0.20 . 7 p. 5c.

RP1630. Panel tests for thermal spalling of fire-clay bricks used at high temperatures.....R. A. Heindl and W. L. Pendergast

Fifty brands of fire-clay brick, of which 16 were of the super duty, 28 of the high heat duty, and 6 of the intermediate heat duty classes, were tested for resistance to spalling by the standard method of the American Society for Testing Materials. Variations from the standard panel of brick in stretcher construction were made by laying brick as headers only, and also in combinations of stretchers and headers. The relation of gas pressure in the conditioning, or preheating, furnace, within the range 0.2 to 0.6 inch of water, to the spalling of firebrick was also investigated. The stability of volume and change in absorption resulting from reheating new specimens at 1,600°C for 5 hours under conditions of controlled gas pressure were determined of all the brands of the super duty class of brick as well as of 10 brands of the high heat duty class, the latter being reheated at 1,400°C only. The relation between the spalling loss by gravity only and after scraping with a trowel was investigated, as was also the relation between the spalling loss and the number of joints in the brick panel. 24 p. 15c.

RP1631. Application of the Ilkovič equation to quantitative polarography.

Floyd Buckley and John Keenan Taylor

Conditions of applicability of the Ilkovič equation to polarographic analysis were investigated for representative ions singly and in mixtures. Gelatin was used to suppress maxima found in current-voltage curves.

Results obtained with a capillary of usual characteristics showed that a suppresser is necessary to secure agreement with the Ilkovič equation over any considerable drop-time range, and that the need increases with the drop-rate of the electrode and the dilution of reducible ion. A criterion of diffusion control satisfactory for classification of polarograms by visual examination was found. The application of the Ilkovič equation to quantitative analysis was shown to be inadvisable unless it is definitely established that the experimental conditions are well within the range for insuring diffusion control. A logarithmic relation between critical drop-time and suppresser concentration was found. 18 p. 10c.

RP1632. Comparative liquid-junction potentials of some pH buffer standards and the calibration of pH meters.

George G. Manov, Nicholas J. DeLollis, and S. F. Acree

By application of the equation $pH = (E - E_{ref} - E_j)/k$ to solutions whose pH values were known accurately, the sum of the potentials of the reference electrode and of the liquid-junction potential, $E_{ref} + E_j$, was obtained at 25°C by the method of cells with liquid junction for seven solutions suitable for standards of pH. The solutions used were 0.1018-*m* hydrochloric acid, pH 1.081; 0.01-*m* hydrochloric acid + 0.09-*m* sodium chloride, pH 2.101; 0.05-*m* potassium acid phthalate + 0.02-*m* potassium chloride, pH 3.989; 0.02-*m* potassium dihydrogen phosphate + 0.02-*m* disodium hydrogen phosphate + 0.02-*m* sodium chloride, pH 6.863; 0.02-*m* potassium phenolsulfonate + 0.02-*m* potassium sodium phenolatesulfonate + 0.02-*m* sodium chloride, pH 8.795; 0.02-*m* boric acid + 0.02-*m* sodium borate (added together as sodium tetraborate) + 0.02-*m* sodium chloride, pH 9.155; and 0.01727-*m* calcium hydroxide + 0.01819-*m* sodium chloride, pH 12.38. Silver-silver-chloride electrodes immersed in saturated potassium chloride solution were used rather than the calomel electrodes customarily employed.

As E_{ref} remains constant when the buffer is changed, values for the differences in the liquid-junction potentials of various buffers in contact with saturated potassium chloride solution were obtained from the data. These differences were then used to calibrate seven Type 015 and three "low-alkali error" glass electrodes of commercial manufacture. The average agreement between the true pH of the buffer-chloride solution (determined from cells without liquid junctions) and that read on various commercial pH meters when corrected for the difference in the liquid-junction potentials and the alkali error of the electrode was ± 0.01 pH unit. The data also furnish a critical test of the consistency of the pH values assigned to the various buffer solutions recommended by this Bureau for the calibration of the pH scale and for checking pH meters.

Recommendations are made for checking pH meters. 13 p. 5c.

RP1633. Spectrographic determination of sodium, potassium, and lithium in portland cement with the direct-current carbon arc.....Armin W. Helz

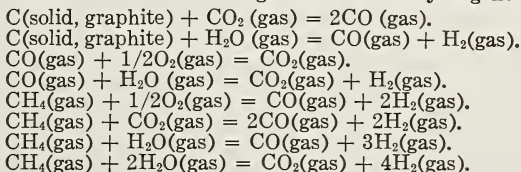
Spectrographic methods, which are much less time-consuming than the usual chemical methods, are described for the determination of sodium, potassium, and lithium in portland cement. For the determination of sodium and potassium the sample is mixed with a mineral base containing silver for the internal standard.

For lithium a standard mixture of graphite and strontium carbonate is added to the cement sample. In either case a fixed amount of the resultant mixture is placed in the crater of a graphite electrode, which is made the lower positive element of a direct-current arc. The Na 8194.81 Å, K 7698.98 Å, and Li 3232.61 Å lines are used for the quantitative calculations. A discussion of the development of the method is given, followed by details of the adopted analytical procedure. The spectrographic analyses of 41 cements for sodium and potassium are given for comparison with the chemical values. 14 p. 10c.

RP1634. Heats, free energies, and equilibrium constants of some reactions involving O_2 , H_2 , H_2O , C, CO, CO_2 , and CH_4
Donald D. Wagman, John E. Kilpatrick, William J. Taylor, Kenneth S. Pitzer, and Frederick D. Rossini

Values are presented for the following thermodynamic properties: The heat-content function, $(H^\circ - H_0^\circ)/T$, the free-energy function, $(F^\circ - H_0^\circ)/T$, the entropy, S° , the heat content, $H^\circ - H_0^\circ$, and the heat capacity, C_p° , for O_2 (gas) to 5,000 °K, H_2 (gas) to 5,000 °K, H_2O (gas) to 3,000 °K, N_2 (gas) to 5,000 °K, C (solid, graphite) to 1,500 °K, C (solid, diamond) to 1,200 °K, CO (gas) to 5,000 °K, CO_2 (gas) to 3,500 °K, and CH_4 (gas) to 1,500 °K; the standard entropy, S° , for H_2O (liq) at 25 °C; the heat of formation, ΔH_f° , the free energy of formation, ΔF_f° , and the equilibrium constant of formation, K_f , from the elements, for H_2O (liq) at 25 °C, and for H_2O (gas), CO (gas), CO_2 (gas), and CH_4 (gas), to 1,500 °K; the increment in heat content, ΔH° , and the increment in free energy, ΔF° , for the transition of graphite into diamond, to 1,200 °K and to 20,000 atmospheres.

From the foregoing, values were calculated for the increment in heat content, ΔH° , the increment in free energy, ΔF° , and the equilibrium constant, K , for the following reactions, most of which are important in connection with the production of liquid hydrocarbon fuels from natural gas or coal and hydrogen:



A table of the fundamental constants used in the calculations is given. 18 p. 10c.

RP1635. Heats of isomerization of the 18 octanes.
Edward J. Prosen and Frederick D. Rossini

The heats of isomerization of all of the 18 octanes were determined by measurement of the ratios of their heats of combustion, in the liquid state for 17 and the solid state for 1, using the procedure previously described for the hexanes and the heptanes.

Values of the heats of isomerization are reported for the condensed (liquid or solid) state at 25°C and for the gaseous state at 25°C and 0°K. 12 p. 5c.

RP1636. Region of usable imagery in airplane-camera lenses... Francis E. Washer

The proper positioning of a lens with respect to the focal plane in a fixed-focus camera, such as an airplane-mapping camera, is governed by several factors that relate to the optical qualities of the lens. These factors are quality of imagery, depth of focus at a given stop opening, and curvature of field. This investigation shows that there is reasonably good agreement between observed depth of focus at a given stop opening and that predicted on the basis of geometric optics. Observed values of the maximum resolving power at various angular separations from the axis are generally lower at the larger stop openings than values predicted on the basis of physical optics. This lowering is doubtless a consequence of residual aberrations, inherent in an actual lens, which are more noticeable at large aperture ratios. A method of presenting the resolving power characteristics throughout the range of useful imagery in the form of sets of master curves has been developed. These curves show at a glance the variation of resolving power with distance from the plane of best axial imagery, the depth of focus for any observed value of the resolving power, the effect of field curvature on imagery in any given image plane, and the differing performance for tangential and radial imagery at various angular separations from the axis. Successive groups of these master curves show how variations in stop opening affect the performance of a lens. 23 p. 10c.

RP1637. Relaxation of stresses in annealing glass. Arthur Q. Tool

An empirical equation representing relaxation of stresses in annealing glass is derived. Although the derivation is based on Maxwell's equation for viscous flow, consideration is also given to the changing viscosity as a glass anneals at a constant temperature. This new equation has been applied to data that were obtained by Adams and Williamson on the relaxation of stresses in annealing glass at various temperatures. It is shown that this equation applies very satisfactorily to their data. Also, it appears to be much more suitable than the reciprocal relation which these authors proposed as a substitute for the wholly unsatisfactory exponential relation that is derived directly from Maxwell's equation. This exponential relation is unsatisfactory simply because it does not take into account the changing viscosity of annealing glass. Finally, the new equation leads to a clearer understanding of the nature and behavior of glass because it does not neglect the change in viscosity. 13 p. 5c.

RP1638. Copper reduction of dextrose, levulose, invert sugar, and sucrose-invert-sugar mixtures in citrate-carbonate solution.

Richard F. Jackson and Emma J. McDonald

The copper reduction values for dextrose, levulose, invert sugar, alone and in the presence of sucrose, have been determined, employing a modified Benedict's copper citrate-carbonate reagent and the iodometric titration method of Shaffer and Hartmann. It has been found that under carefully controlled conditions this method is inferior with respect to precision to the methods of Munson and Walker and of Lane and Eynon, in which caustic alkali is a constituent of the copper reagent. Because of its convenience, it is valuable for rapid work where a precision not greater than 0.5 percent is required.

A table of equivalents for use in routine sugar analysis has been computed. 14 p. 5c.

RP1639. Effect of aeration on hydrogen-ion concentration of soils in relation to identification of corrosive soils. Melvin Romanoff

Soils are generally air-dried to obtain comparable results in the measurement of pH. This paper points out the unreliability of such a procedure in measuring the pH of soils for the identification of corrosive areas. Large changes were observed in hydrogen-ion concentration of a poorly drained soil in passing from the moist field condition to the air-dried state and vice versa. This suggested a further investigation, and 62 air-dried soil samples taken from the National Bureau of Standards soil-corrosion test sites were saturated and stored without air for almost 1 year. Significant changes in pH were observed in the majority of the samples and large changes in many of them. It has been concluded that, for the identification of areas corrosive to iron and steel, pH measurements of soils should be made on samples maintained in the natural field condition. 15 p. 5c.

RP1640. Specific heats of gaseous 1,3-butadiene, isobutene, styrene, and ethylbenzene. Russell B. Scott and Jane W. Mellors

This paper describes a flow calorimeter and measurements of the specific heats of four hydrocarbons that are of interest in connection with synthetic rubber. The measurements on gaseous 1,3-butadiene and isobutene cover the range -35° to $+80^{\circ}\text{C}$. The specific heats of styrene vapor and ethylbenzene vapor were determined at 100°C . The calorimeter was tested by measuring the specific heat of normal hydrogen. The results on the hydrocarbons are believed to be correct to ± 0.5 percent. 12 p. 5c.

RP1641. Free energies and equilibria of isomerization of the 18 octanes.

Edward J. Prosen, Kenneth S. Pitzer, and Frederick D. Rossini

Values of the following thermodynamic properties are presented in tabular and graphical form for the 18 octanes in the ideal gaseous state, for the range 298° to $1,000^{\circ}\text{K}$: (a) the standard free energy of isomerization divided by the absolute temperature, $\Delta F^{\circ}/T$; and (b) the relative amounts of the several isomers present in equilibrium with each other. 7 p. 5c.

RP1642. Heats of combustion and formation of the paraffin hydrocarbons at 25°C .

Edward J. Prosen and Frederick D. Rossini

Selected "best" values are given for the heats of combustion (in oxygen to form gaseous carbon dioxide and liquid water) and the heats of formation (from the elements solid carbon, graphite, and gaseous hydrogen) for methane and ethane in the gaseous state, and for all the paraffin hydrocarbons from propane through the octanes and the normal paraffins through eicosane, in both the liquid (except for one octane which is solid) and gaseous states, all at 25°C . Equations are given for calculating values for all the normal paraffins above eicosane. 7 p. 5c.

RP1643. Comparison of the purity of samples of organic solvents by ultraviolet spectrophotometry. . Marion E. Maclean, Priscilla J. Jencks, and S. F. Acree

Studies of the uniformity of different samples of organic solvents by ultraviolet spectrophotometry are described. The procedure used is applicable to the detection of impurities originally present or formed by deterioration and to the study of the effectiveness of purification procedures.

Absorption curves are given for *n*-heptane, 2,2,4-trimethylpentane, cyclohexane, methylcyclohexane, decahydronaphthalene, benzene, carbon tetrachloride, methyl alcohol, ethyl alcohol, ethyl acetate, and dioxane, in two or more grades of purity. The absorption curves of tetrahydronaphthalene, toluene, xylene, chlorobenzene, ethylene dichloride, trichloroethylene, acetone, dimethyldioxane, and carbon bisulfide are discussed briefly. The effect of filtration through silica gel on the ultraviolet absorption of several commercial solvents is shown. 10 p. 5c.

RP1644. Vapor pressure, latent heat of vaporization, and triple-point temperature of N₂O.....Harold J. Hoge

The vapor pressure of N₂O has been measured from the triple point ($T = 182.351^{\circ}\text{K} = -90.809^{\circ}\text{C}$, $p = 658.9\text{ mm Hg}$) to 236°K ($p = 10.25\text{ atm}$). The data are compared with previous work in a graph that includes the entire liquid range.

The latent heat of vaporization was measured from the triple point to 205°K . At the boiling point ($184.695^{\circ}\text{K} = -88.465^{\circ}\text{C}$) the latent heat is $16.55\text{ kJ mole}^{-1}$. The consistency of the data was tested with Clapeyron's equation, which was also used to compute latent heats above the range of the direct measurements. 12 p. 5c.

RP1645. Methods of polishing steel and their effects upon the protective value of electroplated coatings.....Gerald A. Lux and William Blum

To determine whether the "finish" of steel prior to electroplating affects the protective value of the plated coatings, strips of cold-rolled steel were polished with wheels to which abrasives of different grain size were glued. The resultant finishes were measured with a Profilometer and were expressed as root mean square, in micro-inches (millionths of an inch) of the departure of the contours from a plane surface. The finishes varied from a "superfinish," with root mean square of less than 1 micro-inch to 65 microinch, produced with a 90-grain abrasive. The weight (and average thickness) of steel removed by polishing was measured.

The polished specimens were plated with copper, nickel, and chromium of controlled thickness, and were exposed to the atmosphere at New York, N. Y.; Sandy Hook, N. J.; and Washington, D. C. The extent of rusting observed at periodic inspections was expressed on a numerical scale, and the average results over a period such as 1 year were expressed as "Percentage scores."

Comparison of these scores showed that wide differences in the surface finish of the steel had no significant effects on the protective value of the plated coatings. It is possible that use of hot-rolled steel, which is more likely to contain foreign inclusions, would have yielded differences as a result of polishing.

Results with accelerated tests, such as the salt spray, hot water, ferroxy, and condensation tests, were not as reproducible and consistent as the atmospheric tests. 30 p.

RP1646. Photometer for luminescent materials.....Ray P. Teele

In evaluating the usefulness of luminescent materials it is necessary to take into account the behavior of the human eye at low values of luminance. A photometer that provides for the determination of low luminances, with due regard for the characteristic behavior of the eye at such values, is described. It is interesting to note that both the luminescent materials and some of the phenomena of vision for the nearly dark-adapted eye have been known for many years, although the use of modern lamps to produce higher and higher illuminations has made it generally unnecessary to consider these phenomena. However, the use of the airplane for bombing with the countermeasure of blacking out as a means of passive defense and the need for markers in the interiors of blacked-out ships have shown many of the luminescent materials to be practical instead of merely novel, and has led to the development of methods for measuring the luminances they yield. 8 p. 5c.

RP1647. Freezing temperature of benzoic acid as a fixed point in thermometry.

Frank W. Schwab and Edward Wichers

The freezing temperature of benzoic acid is found to be reproducible with a precision comparable to that of the ice point and somewhat superior to that of the steam point as usually observed in standardizing laboratories. For use in the calibration of thermometric instruments the acid is contained in a partially evacuated glass cell provided with a thermometer well. When thus confined, and if not heated excessively,

the substance maintains a constant composition for long periods of time. When properly manipulated, the acid in a given cell exhibits a freezing temperature reproducible from day to day within 1 millidegree.

The triple point of pure benzoic acid is $122.362^{\circ} \pm 0.002^{\circ}\text{C}$. Under a pressure of 1 atmosphere of dry air the freezing temperature is 0.013 degree higher. Corresponding elevations for oxygen and nitrogen are 0.001 and 0.015 degree, respectively. The pressure coefficient of the freezing temperature is 0.039 degree/atm. The change in volume of the acid on freezing is $-0.138\text{ cm}^3/\text{g}$. The corresponding calculated value for the density of the solid at the freezing temperature is 1.27 g/cm^3 . The solubility of oxygen in the liquid at its freezing temperature, under a pressure of 1 atm., is 0.132 g/1,000 g of acid; that of nitrogen is 0.073 g .

An appendix deals with a method of calculating temperatures, in the ranges -190° to 0°C and 0° to 660°C , from observations with a platinum thermometer. For this purpose power-series equations are used instead of the Callendar and Callendar-Van Dusen equations. Tables are included to facilitate the computation of temperature. 40 p. 10c.

RP1648. pH of aqueous mixtures of potassium dihydrogen phosphate and disodium hydrogen phosphate at 0° to 60°C . Roger G. Bates and S. F. Acree

A method is suggested for computing the pH of phosphate buffers from electromotive-force measurements of cells without liquid junction. Each of the 33 buffer solutions studied was prepared from equal molal quantities of potassium dihydrogen phosphate and disodium hydrogen phosphate. The solutions were divided into five series with respect to the amount of sodium chloride added. The ratios of the molality of each buffer salt to that of sodium chloride in the five series were about 1, 2, 3, 8, and 10. The pH values were computed from measurements of cells with hydrogen electrodes and silver-silver-chloride electrodes by a procedure that involves extrapolation of a function of the emf to zero concentration of sodium chloride.

The values of the second dissociation constant of phosphoric acid given in an earlier paper (RP1524) were confirmed. The mean values of pK , the negative of the common logarithm of the second dissociation constant, are given as a function of absolute temperature, T , by the equation

$$\text{pK} = 2073.0/T - 5.9884 + 0.020912T$$

between $T = 273.16$ and $T = 323.16$ (0° to 50°C). Equations are given to express the change of pH with molality of sodium chloride. The pH values from 0° to 60°C of eight phosphate buffers without chloride are listed. The densities of the buffers were determined. At 25°C , the pH of buffers containing equal molal quantities of potassium dihydrogen phosphate and of disodium hydrogen phosphate is given by the equations

$$\text{pH} = 7.162 + 2.18 m - 2.237 \sqrt{m}$$

and

$$\text{pH} = 7.169 + 2.39 c - 2.324 \sqrt{c},$$

where m and c , the molality and the molar concentration of each buffer salt, lie between 0.005 and 0.1. 22 p. 10c.

RP1649. Melting point of alpha-alumina....R. F. Geller and P. J. Yavorsky

Results are given of seven melting-point determinations on alpha-alumina of high purity in an oxidizing atmosphere and under atmospheric pressure. There was detectable contamination of the specimens by vapors of other elements in the furnace atmosphere, but the results are believed to show that the melting point of alpha-alumina is within the range $2,000^{\circ}$ to $2,030^{\circ}\text{C}$. 7 p. 5c.

RP1650. Heats and free energies of formation of the paraffin hydrocarbons, in the gaseous state, to $1,500^{\circ}\text{K}$.

Edward J. Prosen, Kenneth S. Pitzer, and Frederick D. Rossini

Values are presented for the heats of formation and the free energies of formation, from solid carbon (graphite) and gaseous hydrogen, of all the normal paraffin hydrocarbons and of the isomeric paraffins from the butanes through the octanes, in the gaseous state, to $1,500^{\circ}\text{K}$. 9 p.

RP1651. Method for calculating the properties of hydrocarbons and its application to the refractive indices, densities, and boiling points of the paraffin and monoolefin hydrocarbons.

William J. Taylor, Joan M. Pignocco, and Frederick D. Rossini

A method is described for calculating the properties of hydrocarbons which involves the summation of contributions from component parts of the molecule, together with contributions from interactions between adjacent component parts.

For the paraffin hydrocarbons, the calculations were made in terms of the difference in the value of the property between a given normal paraffin and its isomers, and the required constants were evaluated from data on 33 paraffins, C_5 to C_8 . For these paraffins, the average deviation of the calculated from the experimental values is ± 0.00074 g/ml in density, ± 0.00042 in refractive index (n_D at $20^\circ C$), and $\pm 0.55^\circ C$ in the normal boiling point.

In the case of the monoolefin hydrocarbons, the calculations were made in terms of the difference in the value of the property between a given monoolefin and the corresponding paraffin having the same carbon skeleton, and the required constants were evaluated from data on 58 monoolefins, C_5 to C_7 . For these monoolefins, the average deviation of the calculated from the experimental values is ± 0.0031 g/ml in density, ± 0.0020 in refractive index (n_D at $20^\circ C$), and $\pm 1.33^\circ C$ in the normal boiling point. 22 p. 10c.

RP1652. Separation and determination of aromatic and monoolefin hydrocarbons in mixtures with paraffins and naphthenes by adsorption.

Beveridge J. Mair

A new method is described for separating and determining aromatic and monoolefin hydrocarbons in mixtures with paraffins and naphthenes by adsorption. The mixture to be analysed is introduced into the top of a column of silica gel and, when the liquid level just reaches the top of the silica gel, a suitable desorbing liquid, such as ethyl alcohol, is added. The desorbing liquid forces the hydrocarbon portion down the column, during which passage the hydrocarbon portion is fractionated according to the adsorbability of the various components. These components issue from the bottom of the column in the following order: Paraffin plus naphthene, monoolefin, and aromatic hydrocarbons. The analysis is made by determining the fraction of the total volume constituted by each of these classes.

Results of the analyses of five solutions containing aromatic and paraffin hydrocarbons, and three solutions containing aromatic, monoolefin, and paraffin hydrocarbons are given. A procedure is outlined for determining the aromatic content of a straight-run petroleum distillate, as in the gasoline or kerosine fractions. 18 p. 10c.

RP1653. Methods for the evaluation of analytical filter papers.

B. W. Scribner and W. K. Wilson

As part of an investigation of analytical filter papers for the purpose of assisting in the development of standards of quality, improved methods for rate of flow of water, retention of fine precipitates, and determination of ash were developed. The use of complicated apparatus for measuring the rate of flow of water was avoided by applying Darcy's law to the ordinary conical filter. The use of prefiltered water in making the measurement was found necessary for satisfactory reproducibility. As the standard method for determining the ash content of paper is not sufficiently accurate for filter paper, the method was modified in that a tare crucible is used and the test specimen wetted and pressed into a compact wad to permit the use of as small a crucible as possible.

The other tests were bursting strength of wet paper, thickness, weight per unit area, alpha cellulose, copper number, and acidity (pH). The last three named are of importance relative to the purity of the cellulose and the stability of acid-washed papers, as instances of deterioration of the cellulose of such papers have been observed. Action of acid results in brittling of the papers and in the formation of modified forms of cellulose that are soluble in some solutions. 7 p. 5c.

RP1654. Intrinsic viscosities and osmotic molecular weights of cellulose acetate fractions.....Arnold M. Sookne and Milton Harris

The intrinsic viscosities and osmotically estimated number-average molecular weights of a series of cellulose acetate fractions have been measured. It was found that within the range of chain lengths investigated (number-average molecular weight, $\bar{M}_n$, up to 130,000) the number-average molecular weights are proportional to the intrinsic viscosities in acetone solutions, in agreement with Staudinger's rule and the results of Kraemer. An estimate is provided of the relative homogeneity with respect to molecular size of the fractions and the starting material from which they were prepared. 8 p. 5c.

RP1655. Polymolecularity and mechanical properties of cellulose acetate.

Arnold M. Sookne and Milton Harris

The tensile strengths, ultimate elongations, and folding endurances of films prepared from a series of cellulose acetate fractions and blends were studied. When the mechanical properties are plotted against the intrinsic viscosities (or relative weight-average degrees of polymerization), the results for the fractions and different blends fall on separate curves. In contrast, when the mechanical properties are plotted against

the number-average degrees of polymerization, the results for the fractions and all of the blends fall approximately on a single curve for each property. The results are shown to be qualitatively consistent with the hypothesis that the mechanical properties of blends are the weight-averages of the properties of their components. The results emphasize the importance of the determinations of the number-average degree of polymerization in studying commercial polymolecular materials. 10 p. 5c.

RP1656. Term analyses of the first two spectra of columbium.

Curtis J. Humphreys and William F. Meggers

Published wavelengths and estimated intensities of lines characterizing the first two spectra of columbium (RP881) have been supplemented by observations of the arc spectrum (6500 to 8500 Å) in an atmosphere of helium, by observations of the spark spectrum (2000 to 2100 Å), and by measurements of the Zeeman patterns for 1,557 lines. All available data have been analyzed for the purpose of correcting and extending the information about the structures of Cb II and Cb I (RP793).

The Cb II table contains 1,723 lines (2002.41 to 7026.15 Å), 1,494 of which are explained as combinations of 183 ionic energy levels comprising 27 singlet, 40 triplet, and 9 quintet spectral terms. The terms arising from electron configurations $4d^4$, $4d^3 5s$, and $4d^3 5p$ have been almost completely established, but efforts to find spectral series for Cb II were futile. The lowest energy (normal state) of Cb⁺ ions is represented by $(4d^4) a^5D_0$, but the strongest emission lines involve $(4d^3 5s) a^5F$, a metastable term. The most intense line of the Cb II spectrum is $(4d^3 5s) a^5F_5 - (4d^3 5p) z^5G_6$, with a wavelength of 3094.172 Å. Zeeman patterns observed for 646 Cb II lines were most helpful in extending this analysis, which now includes 87 percent of the recognized lines and 95 percent of their total intensity.

The Cb I table contains 3,313 lines (2164.54 to 10920.7 Å), 2,836 of which have been interpreted as combinations of 364 atomic energy levels representing 58 doublet, 55 quartet, and 13 sextet spectral terms. The lowest term (normal state of neutral Cb atoms is $(4d^4 5s) a^6D_{0\frac{1}{2}}$, and the strongest line of the Cb I spectrum is the transition $(4d^4 5s) a^6D_{4\frac{1}{2}} - (4d^4 5p) y^6F_5\frac{3}{2}$, with a wavelength of 4058.931 Å. The Cb I spectrum is largely accounted for by transitions between levels arising from $4d^4 5s$ or $4d^3 5s^2$ and $4d^4 5p$ or $4d^3 5s5p$ electron configurations. Zeeman patterns measured for 911 Cb I lines have been 90 percent interpreted in this analysis, which now includes 86 percent of the known lines and over 93 percent of their intensity. Two members of the series $(4d^4 ns) ^6D$ and two each of $(4d^3 5s np) ^4(DFG)$ have been established. Extrapolation of these indicates a limit of 54,600 cm⁻¹, which represents the energy difference between the normal states of Cb atoms and Cb⁺ ions. The corresponding ionization potential for neutral columbium atoms is 6.77 volts. 109 p. 25c.

RP1657. Diamond cutting accelerated by an electric arc.

Chauncey G. Peters, Karl F. Nefflen, and Forest K. Harris

The method universally employed for cutting plane surfaces or facets on diamonds has been to place the diamond in contact with a flat cast-iron lap charged with diamond powder and rotated at about 2,000 revolutions per minute. In the work described in this paper it was found that by producing a high-voltage electric arc at the contact between the diamond and the lap, the cutting rate is materially increased for all orientations of the diamond, and good progress can be made directly on a natural octahedron face, where cutting without the arc is almost impossible.

By applying the arc to a diamond saw the sawing rate is greatly increased, and diamonds can be sawed regardless of the orientation of the cut relative to the crystal axes. 7 p. 10c.

RP1658. A transfer strain gage for large strains.

Martin Greenspan and Leroy R. Sweetman

A simple strain gage, suitable for measurement of strains of from - 16 to + 32 percent on a 1.5-inch gage length, is described. 3 p. 5c.

RP1659. Refractive-index standards of fluorocrown glass. Leroy W. Tilton

Refractive-index samples of fluorocrown glass, which provide solid standards in the index range between fused quartz, $n_D = 1.458$, and low index silicate crown glass, $n = 1.51$, are characterized by very low temperature coefficients of index, and thus are especially recommended for use at extreme room temperatures. The calibration of such standards may be facilitated by comparisons with the precise data herein tabulated for six of these glasses in the temperature range 15° to 55°C. Because of surface weathering, repolishings are sometimes necessary to avoid hazy and possibly false critical border lines. In some cases bright bands appear in the dark portion of the refractometer field. These are interpreted as critical-angle phenomena corresponding to decomposition products in the surface layers. 10 p. 5c.

Title page and contents for volume 34. 7 p. 5c.

RP1660. Single-cylinder engine tests of substitute motor fuels. . . . Donald B. Brooks

Single-cylinder-engine tests of nonhydrocarbon fuels and gasoline, at fixed compression ratio and at the compression ratio for trace knock for each fuel, show no material differences in performance other than those associated with differences in heats of combustion and vaporization. All the nonhydrocarbon fuels could be operated at compression ratios higher than was permissible with the gasoline, with corresponding increases in power and thermal efficiency. 37 p. 10c.

RP1661. Thermodynamic properties of 1,3-butadiene in the solid, liquid, and vapor states.

Russell B. Scott, Cyril H. Meyers, Robert D. Rands, Jr., Ferdinand G. Brickwedde, and Norman Bekkedahl

This paper presents a detailed description of apparatus used and the results obtained in the following measurements relating to the thermodynamic properties of 1,3-butadiene in the solid, liquid, and vapor states: (1) Specific heats from -258° to $+30^{\circ}\text{C}$, (2) heat of fusion, (3) heats of vaporization from -26° to $+23^{\circ}\text{C}$, (4) vapor pressures from -78° to $+110^{\circ}\text{C}$, (5) liquid densities from -78° to $+95^{\circ}\text{C}$, (6) vapor densities from 30° to 150°C , and (7) the critical pressure, volume, and temperature of 1,3-butadiene. Tables embodying the results of these measurements are included for specific heats, enthalpy, and entropy of the solid, liquid, and vapor. 48 p. 10c.

RP1662. Effects of some oxide additions on the thermal length changes of zirconia.

R. F. Geller and Paul J. Yavorsky

The oxides of cerium, yttrium, silicon, magnesium, and calcium were added in various proportions to zirconia of 99-percent purity, and the effects of these additions, combined with preheating at various temperatures ranging from $1,450^{\circ}$ to $1,950^{\circ}\text{C}$, on thermal length changes of the zirconia during heating and cooling between room temperature and a maximum of $1,700^{\circ}\text{C}$ were observed. The results are compared with similar observations on zirconia of 96-, of 98-, and of 99-percent purity without oxide additions.

The results show that the irregular thermal length changes accompanying phase transformations in zirconia may be prevented by changing the crystal to the stable cubic form. This was accomplished by (a) 11.5- and 15-percent additions of Y_2O_3 and heating at $1,700^{\circ}\text{C}$ or higher; (b) 8- and 15-percent additions of MgO and heating at $1,550^{\circ}\text{C}$ or higher, but only for the range from room temperature to $1,200^{\circ}\text{C}$; and (c) 5-, 6-, 8-, and 15-percent additions of CaO and heating at $1,550^{\circ}\text{C}$ or higher, but additions of more than 6 percent caused the specimens to be very porous and proportionately weak. In all cases, however, the expansion during heating and contraction during cooling was relatively high. The coefficients of linear thermal expansion of the specimens that were all, or nearly all, cubic ranged from 8.8 to 11.8×10^{-6} . Also, zirconia has a low thermal conductivity relative to such materials of high thermal expansion as alumina, magnesia, and beryllia (unpublished data). Consequently, a high resistance to thermal shock cannot be expected of the stabilized product, even though it is not subject to the structural disintegration characteristic of the commercially pure material. 24 p. 10c.

RP1663. Acetyl derivatives of certain heptoses, of gulose, and of lactulose.

Harriet L. Frush and Horace S. Isbell

In the course of an investigation of the stereomeric factors that influence the course of replacement reactions, several new acetyl derivatives of the sugars were prepared. Inasmuch as the sugar acetates are of importance for analytical purposes, for the synthesis of other substances, and for the elucidation of structure, the new compounds are reported, even though the study of the reaction mechanisms has been temporarily discontinued. The preparation and properties are given for several new acetates of the heptoses, and for acetates of D-gulose, D-glucoheptulose, and lactulose.

The following new compounds are reported: Hexaacetyl-D-glycero- β -D-ido-aldoheptose, melting point 136°C , $[\alpha]_D^{20}$, -9.1° ; pentaacetyl-D-glycero-a-D-ido-aldoheptosyl bromide, melting point 114°C , $[\alpha]_D^{20}$, $+143^{\circ}$; methyl pentaacetyl-D-glycero- β -D-ido-aldoheptoside, melting point 136° to 137°C , $[\alpha]_D^{20}$, -31.3° ; hexaacetyl-D-glycero-a-D-talo-aldoheptose, melting point 137°C , $[\alpha]_D^{20}$, $+88.8^{\circ}$; hexaacetyl-D-glycero-L-galacto-aldoheptoses (crystalline mixture); pentaacetyl-D-gulose, melting point 113°C , $[\alpha]_D^{20}$, $+86.2^{\circ}$ (needle form), and melting point 105° to 106°C , $[\alpha]_D^{20}$, $+86.2^{\circ}$ (prismatic form); pentaacetyl-D-glucoheptulose, melting point 114° to 115°C , $[\alpha]_D^{20}$, $+45.9^{\circ}$; octaacetyl-lactulose, melting point 138°C , $[\alpha]_D^{20}$, -6.6° . 14 p. 5c.

RP1664. Mass spectrometric analyses of hydrocarbon and gas mixtures.

A. Keith Brewer and Vernon H. Dibeler

The basic principles underlying mass spectrometric analysis of hydrocarbon and gas mixtures are outlined. The method of calculating the composition from the mass-abundance records is described. Analyses of a number of hydrocarbon and other gas mixtures are shown. Whenever possible comparisons with different methods of analyses are given. The reproducibility and the accuracy obtainable in mass spectrometric analyses are described. 16 p. 10c.

RP1665. Heats of combustion and isomerization of the eight C_9H_{12} alkylbenzenes.

Walter H. Johnson, Edward J. Prosen and Frederick D. Rossini

The heats of isomerization of the eight C_9H_{12} alkylbenzenes were determined by measurement of the ratios of the heats of combustion in the liquid state of purified samples of these compounds by the procedure previously described for the hexanes, heptanes, and octanes. The data yield the following values for the heat of isomerization in the liquid state at $25^\circ C$, ΔH° , of *n*-propylbenzene into each of the C_9H_{12} alkylbenzenes, in kilocalories per mole: *n*-propylbenzene, 0.00; isopropylbenzene, -0.67 ± 0.16 ; 1-methyl-2-ethylbenzene, -1.93 ± 0.16 ; 1-methyl-3-ethylbenzene, -2.48 ± 0.19 ; 1-methyl-4-ethylbenzene, -2.74 ± 0.26 ; 1,2,3-trimethylbenzene, -4.83 ± 0.22 ; 1,2,4-trimethylbenzene, -5.61 ± 0.16 ; 1,3,5-trimethylbenzene, -6.00 ± 0.26 . These data were combined with the value previously reported for the heat of combustion of *n*-propylbenzene to obtain values for the heats of combustion of each of the C_9H_{12} alkylbenzenes in the liquid state at $25^\circ C$. 6 p. 5c.

RP1666. Thin-walled aluminum beta-ray tube counters.

Burrell W. Brown and L. F. Curtiss

A description is given of aluminum-tube Geiger-Muller counters having a wall thickness of 0.004 inch and constructed from commercially available tooth-paste tubes. These tubes as furnished are in the hard temper and have uniform wall thickness, which enable them to stand complete evacuation without a tendency to collapse. By copperplating the aluminum it is possible to soft-solder fittings to the tube to construct a counter that can be permanently sealed after filling and that will maintain its characteristics over a long period. The procedure reduces the cost of making this type of counter, as the aluminum tubes are inexpensive, and very simple operations are required in the construction of the counters. 4 p. 5c.

RP1667. Method of lagrangian curvilinear interpolation.....William J. Taylor

This report describes a simplified method of computing Lagrangian coefficients for curvilinear interpolation, which may be used when tables of Lagrangian coefficients are not available or when tables are available but the coefficients are not tabulated for the exact fraction of the interval to which the interpolation is to be made. 6 p. 5c.

RP1668. An apparatus for photographing interference phenomena. James B. Saunders

A photographic instrument is described that was designed for recording the changes produced in the order of interference fringes over long periods and for recording large changes in the order of interference. When this instrument is used with interferometric systems for studying the changes caused in transparent solids by heating, it can be made to yield a continuous record of the simultaneous changes in temperature, time, index, strain, and density. For example, to record those changes that are caused by the annealing of an optical glass at an annealing temperature near the lower part of its annealing range requires several weeks of continuous recording. The total amount of 35-millimeter film needed by the instrument for such a record (covering, say 3 months) does not necessarily exceed 10 feet. To record the expansion of a material that is being heated from room temperature to $500^\circ C$, at a rate of 3 degrees centigrade per minute, requires approximately 1 foot of 35-millimeter film. Thus, even very long tests require such a small amount of film that the operator is able to process it in any small dark room. The fringes are photographed at their natural size, and the fringe shifts can be determined from the photographic record without the use of enlarging or projection equipment. 30 p. 10c.

RP1669. Lapped bar splices in concrete beams.

Ralph W. Kluge and Edward C. Tuma

An investigation was conducted to determine the general behavior and strength of lapped bar splices that varied in length and method of lapping. The bond strength developed in the splice and the slip of bar were determined for two types and two sizes of reinforcement. The resulting data clearly illustrated the manner in which the stress was transferred from one lapped bar to the other; the relative merits of the two

types of bars, as well as the effectiveness of the two methods of lapping, are also shown. 32 p. 10c.

RP1670. Vapor pressures and boiling points of some paraffin, alkylcyclopentane, alkylcyclohexane, and alkylbenzene hydrocarbons.
Charles B. Willingham, William J. Taylor, Joan M. Pignocco, and Frederick D. Rossini

Measurements of vapor pressures and boiling points, over the range 47 to 780 millimeters of mercury and above about 12°C, were made on 52 purified hydrocarbons. The apparatus consisted of an electrically heated boiler, a vapor space with a vertical reentrant tube containing a platinum thermometer having a resistance of 25 ohms, and a condenser. Measurements of the temperature of the liquid-vapor equilibrium were made at 20 fixed pressures maintained automatically. The values of the fixed pressures were determined by calibration of the apparatus with water by using the vapor pressure-temperature tables prepared at the National Bureau of Standards.

The experimental data on the hydrocarbons were correlated, the method of least squares being used, with the three-constant Antoine equation for vapor pressures, $\log P = A - B/(C + t)$ or $t = B/(A - \log P) - C$. Experimental data together with the values of the three constants of the Antoine equation, applicable over the range of measurement, are reported for 30 paraffin, 4 alkylcyclopentane, 10 alkylcyclohexane, and 8 alkylbenzene hydrocarbons. 26 p. 10c.

RP1671. Color standard for ruby mica.....Deane B. Judd

At the request of the Metals Reserve Company and the War Production Board, a study has been made of the color classification of mica used by the mica-consuming industry. This classification has been found to be consistent and can be reproduced from the chromaticity of the mica specimen and its daylight transmission considered in relation to thickness. A method of defining ruby mica in these terms is described, and as it does not depend upon the physical integrity of any material color standard, this definition constitutes a fundamental color standard for ruby mica. This standard is particularly for application to micas close to the border line between ruby and nonruby. 12 p. 5c.

RP1672. Compression of sole leather.....Charles E. Weir

Specimens of sole leather were subjected to indentation tests and compressive tests. Comparisons between compression data and the indentation numbers of the original dry leather show that compression may be used as a measure of indentation. Compression of dry leather gives results showing better correlation between the methods and eliminates distortions occurring when moist leather is compressed. Compression data show satisfactory reproducibility. Compression for a three-minute period is adequate for test purposes, all changes being completed in this interval with the exception of a very minute compression proceeding at a slow rate. Compensation for variations in thickness of specimens may be effected by expressing the results in terms of percentage compression. Area and shape of specimens do not affect the compression appreciably. Compression-decompression curves show large hysteresis loops. The effect of tannery rolling in compressing leather is estimated to be equivalent to that produced by pressures of from 2,000 to 3,000 lb/in². Based upon the data obtained in the compressive tests, the lower limit of the coefficient of compressibility of leather is estimated to be $33 \times 10^{-6} \text{ bar}^{-1}$. 16 p. 5c.

RP1673. Knock ratings of gasoline substitutes.....Afton D. Puckett

Knock ratings of gaseous paraffins and olefins through C₄, and of carbon monoxide, were determined by current motor and aviation test methods. Auxiliary apparatus and modifications of test engines necessary to rate gases are described.

Antiknock qualities of ethyl and normal butyl alcohol, and acetone, both alone and in blends, were determined by current motor-fuel rating procedures. Blending characteristics of these materials with straight run gasolines and naphthas were investigated.

Diethyl ether in ethyl alcohol blends showed a high positive sensitivity (Coordinating Fuel Research Committee (CFR) research minus American Society for Testing Materials (ASTM) motor octane number) for ether concentrations below 48 percent and a high negative sensitivity above that figure. The tests indicated that blends containing up to 45 percent of ether should give relatively knock-free performance under conditions of steady operation. 12 p. 5c.

RP1674. Hysteresis in the physical adsorption of nitrogen on bone char and other adsorbents.....Leland F. Gleysteen and Victor R. Deitz

An investigation has been made of some characteristics of hysteresis in the physical

adsorption of nitrogen on bone char, activated carbon, silica gel, and coconut-shell charcoal at 77.4°K. It was found that hysteresis became less pronounced in the order given, occurring only slightly in coconut-shell charcoal and only from high relative pressures in the pressure range in which the Langmuir equation was not obeyed. It was shown that it was highly probable that a true steady state was attained in the pressure determinations and that the time dependency of adsorption and desorption are compatible with the requirements of diffusion processes. In this paper the theories of hysteresis are reviewed on the basis of capillary condensation, and an alternative interpretation is suggested in terms of the theory of multimolecular adsorption. 24 p. 10c.

RP1675. Some physical properties of mica. Peter Hidnert and George Dickson

This paper gives data on the linear thermal expansion, changes in structure, power factors, and effects of heat treatments on the thickness, opacity, and color of micas (muscovite, phlogopite, biotite, ripidolite, and zinnwaldite) from different domestic and foreign sources. Tremendous linear thermal expansion was noted for some samples of phlogopite and biotite micas in a direction perpendicular to the cleavage plane. The transitions shown in the expansion curves of these samples at elevated temperatures appear to be related to the structural changes indicated in the X-ray diffraction patterns. Heat treatment of two phlogopite micas and two muscovite micas to 600°C, with or without a load, caused considerable increases in the power factors of the former and only slight changes in the latter. Nearly all the muscovite samples showed the greatest increases in thickness (up to 155 percent) after heat treatment at 800°C. The large increases in thickness of nearly all the muscovite samples accompanied changes from clear or translucent to opaque, or from polychrome to metallic color. None of the species of mica can be considered as a substance or material of fixed and reproducible properties. The physical properties of mica depend largely upon the chemical composition, the nature of the crystals, their magnitude and orientation, the presence of impurities, the way in which these enter the structure, the heat treatment, etc. Some of the phlogopite and biotite micas that possess tremendously high thermal expansion in a direction perpendicular to the cleavage plane may be used for high-expanding elements in temperature-responsive devices but may be unsatisfactory for use in devices in which large changes in dimensions with changes in temperature are not desirable. 46 p. 10c.

RP1676. Determination of the purity of hydrocarbons by measurement of freezing points.

Augustus R. Glasgow, Jr., Anton J. Streiff, and Frederick D. Rossini

An improved and simplified procedure is described for determining the freezing points of hydrocarbons from time-temperature freezing and melting curves, and for calculating the purity when the freezing point for zero impurity is (a) known and (b) not previously known. A procedure for determining the cryoscopic constant is also described. 20 p.

RP1677. Effect of pressure on the melting of crystalline rubber.

Lawrence A. Wood, Norman Bekkedahl, and Ralph E. Gibson

The effect of hydrostatic pressure on the melting of crystalline rubber has been the subject of a brief investigation extending to pressures above 1,000 atmospheres. With a particular sample of stark rubber, it was found possible to raise the temperature of melting, as determined by the disappearance of birefringence, from about 36° to 70°C by the application of a pressure of 1,170 bars ($1,170 \times 10^6$ dynes/cm²). The results, including observations at intermediate pressures, can be represented adequately by the equation $\log_{10} (p + 1,300) = 5.9428 - (875/T)$. 6 p. 5c.

RP1678. Second dissociation constant of *o*-phthalic acid and related pH values of phthalate buffers from 0° to 60°C. Walter J. Hamer and S. F. Acree

Measurements were made of the potential difference between hydrogen electrodes and silver-silver-chloride electrodes in aqueous solutions of 72 different phthalate-chloride mixtures at 13 temperatures from 0° to 60°C. By described experimental and mathematical procedures, the second dissociation constant of *o*-phthalic acid and related thermodynamic quantities were evaluated, and pH values were assigned to 217 solutions, including some containing no potassium chloride. The addition of the chloride lowers the pH of the solutions principally because of an increase in the ionic strength.

The second dissociation constant may be computed at each temperature by the equation

$$\log K_2 = -2175.83/T + 9.55095 - 0.025694T,$$

where $T = t^\circ\text{C} + 273.16$.

The pH values of the solutions may be computed for ratios of dipotassium phthalate to acid potassium phthalate from 1 to 2, and for ionic strengths, μ , from 0. to 0.5, by the equation

$$\text{pH} = -\log K_2 + \log \frac{\text{dipotassium phthalate}}{\text{acid potassium phthalate}} - 3A \sqrt{\mu} / (1 + 3.76B \sqrt{\mu}) + \beta\mu,$$

in which A and B are constants dependent upon the temperature, and β is a constant dependent upon the temperature, salt concentration, and buffer ratio.

The addition of potassium chloride lowers the pH of the solutions in accordance with the equation

$$\text{pH} = (\text{pH})_0 + \alpha_1 m \text{KCl} + \alpha_2 m^2 \text{KCl} + \alpha_3 m^3 \text{KCl},$$

where $(\text{pH})_0$ is the value at any temperature for a solution containing no potassium chloride and α_1 , α_2 , and α_3 are constants.

These solutions with or without potassium chloride are useful as pH standards from 4.87 to 5.72 and vary only slightly with changes in temperature. They have good buffer capacity and may be readily prepared from pure materials. The NBS Standard Samples 84a and 84b of acid potassium phthalate or Standard Samples of comparable purity are recommended for preparation of the solutions, together with carbonate-free potassium hydroxide of high grade and distilled water of pH 6.7 to 7.3. 36 p. 10c.

RP1679. Impact strength of nylon and of sisal ropes.

Sanford B. Newman and Helen G. Wheeler

Static and impact tests were made on spliced specimens of $\frac{7}{16}$ -inch-diameter three-strand nylon rope and $\frac{9}{16}$ -inch-diameter, four-strand, sisal rope.

The stretch of the ropes under impact and static loading up to failure was measured, and from these data energy-stretch behavior was determined.

It was found that the energy required to cause failure under impact loading was greater than the energy required to cause failure under static loading. The stretch of the rope at failure was practically the same under impact and static loading.

The results of these tests indicate that energy values computed from static tests of these ropes give a safe estimate of the performance of the rope under impact loading. 15 p. 10c.

RP1680. Oxidation of galacturonic acid and of 5-keto-gluconic acid in alkaline solution.

Horace S. Isbell and Nancy B. Holt

In the present investigation determinations were made of the quantities of oxalate, tartrate, and trihydroxyglutarate formed by the oxidation of galacturonic acid and of 5-keto-gluconic acid in the presence of various bases and various concentrations of the base. Although preliminary measurements indicate that the proportions of the products can be altered by use of catalysts, this report is restricted to the results obtained without the addition of catalytic substances. Oxidation of sodium galacturonate with oxygen in 1-*N* sodium hydroxide solution gave oxalate, D-tartrate (levo), and D-*arabo*-trihydroxyglutarate in yields of 0.10, 0.10, and 0.45 mole, respectively, per mole of galacturonate. Oxidation of sodium 5-keto-gluconate under like conditions gave oxalate, L-tartrate (dextro), and *xylo*-trihydroxyglutarate in yields of 0.29, 0.10, and 0.45 mole, respectively, per mole of sodium 5-keto-gluconate. Directions are included for the preparation of potassium D-*arabo*-trihydroxyglutarate from galacturonic acid. 6 p. 5c.

RP1681. Utilization of nonpetroleum fuels in automotive engines.

Jesse T. Duck and Clarence S. Bruce

A number of substitute fuels and blends were tested to determine their relative efficiency in the operation of common types of engines. The tests showed that the maximum power developed with alcohol and with some of the other fuels was slightly greater than with gasoline. The specific fuel consumption with the various fuels was approximately in inverse proportion to the heat of combustion of the fuel used. Analysis showed that the mixture distribution was less uniform with the substitute fuels than with gasoline. Tests made with low-proof alcohols showed that an engine can be operated on blends as low as 70 proof, but it is ordinarily impractical to use a blend much below 190 proof because of the excessive volume required. 27 p. 10c.

RP1682. Heats, equilibrium constants, and free energies of formation of the acetylene hydrocarbons through the pentyne, to 1,500°K.

Donald D. Wagman, John E. Kilpatrick, Kenneth S. Pitzer, and Frederick D. Rossini

Values are presented for the following thermodynamic properties for acetylene, propyne (methylacetylene), 1-butyne (ethylacetylene), 2-butyne (dimethylacetylene), 1-pentyne (*n*-propylacetylene), 2-pentyne (methyl ethylacetylene), and 3-methyl-

1-butyne (isopropylacetylene), in the gaseous state, to 1,500°K: The heat-content function, $(H^\circ - H^\circ_0)/T$; the free-energy function, $(F^\circ - H^\circ_0)/T$; the entropy, S° ; the heat content, $H^\circ - H^\circ_0$; the heat capacity, C_p° ; the heat of formation from the elements, ΔH_f° ; the free energy of formation from the elements, ΔF_f° ; and the logarithm of the equilibrium constant of formation from the elements, $\log_{10} K_f$.

Equilibrium constants and concentrations of components are given in tabular and graphical form for the isomerization of the two butynes and of the three pentynes as a function of temperature to 1,500°K. Equilibrium constants are also given in tabular and graphical form for the dehydrogenation of ethane to ethylene to acetylene, of propane to propylene to propyne, of *n*-butane to 1-butene to 1-butyne, and of *n*-pentane to 1-pentene to 1-pentyne. 30 p. 10c.

RP1683. Reaction of periodic acid on the difructose anhydrides.

Emma J. McDonald and Richard F. Jackson

Diheterolevulosan, difructose anhydrides I, III, and II react, respectively, with 4, 2, 1, and 1 moles of periodic acid per mole of sugar. These results are in keeping with the known structures of the first three sugars. It is suggested that difructose anhydride II is a 1,2'-2,4'-difructofuranose. 4 p. 5c.

RP1684. Thermodynamic properties of solid and liquid ethylbenzene from 0° to 300°K.....Russell B. Scott and Ferdinand G. Brickwedde

The following properties of a sample of high purity ethylbenzene were measured: (1) Specific heat of solid and liquid from 15° to 300°K; (2) triple-point temperature ($-95.005 \pm 0.010^\circ\text{C}$ for pure ethylbenzene); (3) heat of fusion ($86.47 \text{ int. j g}^{-1}$); (4) heat of vaporization at 294°K ($400.15 \text{ int. j g}^{-1}$); and (5) vapor pressure from 273° to 296°K. With these experimental data, the enthalpy and entropy of the solid and of the liquid in the range 0° to 300°K were calculated. 12 p. 5c.

RP1685. Assembly and calibration of a density balance for liquid hydrocarbons.

Alphonse F. Forziati, Beveridge J. Mair, and Frederick D. Rossini

The assembly and calibration are described of a density balance for rapidly measuring the densities of liquid hydrocarbons on samples as small as 9 milliliters in volume. The reproducibility of the measurements is ± 0.00002 to ± 0.00003 gram per milliliter and the over-all uncertainty is estimated to be about ± 0.00005 gram per milliliter. 7 p. 5c.

RP1686. Ultraviolet spectra and dissociation constants of *p*-hydroxybenzoic acid, methyl, ethyl, *n*-butyl, and benzyl *p*-hydroxybenzoate and potassium *p*-phenolsulfonate.

Elizabeth E. Sager, Marjorie R. Schooley, Alice S. Carr, and S. F. Acree

The apparent first and second dissociation constants of *p*-hydroxybenzoic acid, the constants for the phenol group of methyl, ethyl, *n*-butyl, and benzyl *p*-hydroxybenzoate, and potassium *p*-phenolsulfonate have been determined from ultraviolet spectral data. The compounds have wide absorption bands located in the region of 200 to 400 $m\mu$, and the differences between the transmittancy curves for their ionic and molecular forms are great enough to permit the measurement of several intermediate steps in the transformation at various pH values. The buffers used to control the dissociation were acetates, phosphates, and borates, all of low ionic strengths. Esterification of the carboxyl group of *p*-hydroxybenzoic acid apparently increases the dissociation of the phenol, and *pK* decreases from 9.3 for the second dissociation of the acid to 8.3 for the esters. The thermodynamic dissociation constants are estimated. 18 p. 10c.

RP1687. First dissociation constant of *o*-phthalic acid and related pH values of phthalate buffers from 0° to 60°C.

Walter J. Hamer, Gladys D. Pinching, and S. F. Acree

Measurements were made at 5-degree intervals from 0° to 60°C of the potential difference between hydrogen electrodes and silver-silver-chloride electrodes in 45 aqueous solutions that contained various amounts of *o*-phthalic acid, acid potassium phthalate, and potassium chloride. The first dissociation constant of *o*-phthalic acid and related thermodynamic quantities were evaluated, and pH values were assigned to each of the 45 solutions.

The equation obtained for the first dissociation constant as a function of temperature is

$$\log K_1 = -561.57/T + 1.2843 - 0.0078833 T,$$

where $T = t^\circ\text{C} + 273.16$.

The pH values of the solutions range from 2.70 to 3.26 and vary only slightly with changes in temperature. The solutions have good buffer capacity and may

be readily prepared from pure materials. Each solution is suited for use as a pH standard.

The separation of the carboxyl groups in *o*-phthalic acid was found to be 1.66 Å by means of an equation relating this distance with the ratio of the two dissociation constants of *o*-phthalic acid. This value is higher than 1.53 Å obtained from X-ray measurements of the carbon-carbon distance in the diamond and 1.43 in the benzene molecule.

The problem of convergence or lack of convergence of apparent dissociation constants calculated by different methods to a single thermodynamic value in the limit of infinite dilution is discussed. 26 p. 10c.

Title page and contents for volume 35. 6 p. 5c.

RESEARCH PAPERS FROM JOURNAL OF RESEARCH OF THE NATIONAL BUREAU OF STANDARDS, VOLUME 36, JANUARY—JUNE 1946

RP1688. Specification of railroad signal colors and glasses.

Kasson S. Gibson, Geraldine Walker Haupt, and Harry J. Keegan

This paper is a continuation of Bureau Research Paper RP1209 and describes the cooperative work done by the Association of American Railroads Signal Section, Corning Glass Works, and the National Bureau of Standards leading to the formulation of the AAR Signal Section specifications for signal colors and glasses.

The previous paper defined the luminous transmission scale used by the signal engineers and glass manufacturers. The present paper describes the glasses selected by these engineers to define the limits of acceptable chromaticities afforded by these glasses when combined with kerosine or electric illuminant. The spectral transmissions of the glasses are given, together with the luminous transmissions and chromaticities for the specified illuminants.

The photometric and colorimetric parts of the AAR Signal Section three-part specifications are illustrated and the reasons given for the choice of tolerances both on the acceptable signal colors and on the glasses certified by the National Bureau of Standards as duplicates of the standard limit glasses.

Various other data of interest are given, including the expression of the permissible chromaticities of signal colors in a uniform-chromaticity-scale coordinate system. 30 p. 10c.

RP1689. Attack on refractory clay pots by optical glasses.

Willard H. Parsons and Herbert Insley

Examinations were made of the walls and bottoms of approximately 200 refractory clay pots of lined and unlined types to determine the extent of penetration of optical glasses into refractory material. Examinations made with a petrographic microscope of samples of unused pot bottom indicated the structure of the heat-treated refractory. Similar examinations of selected samples from the bottoms of 62 used pots revealed the manner of attack by corrosive glasses and identified the crystalline and glassy reaction products formed. These reaction products were found at the interface between refractory and glass and within pot bottoms penetrated by glass. The pots were used in the manufacture of barium crown, barium flint, light crown, borosilicate crown, and several different flint optical glasses. 15 p. 10c.

RP1690. pH standards at various temperatures: Aqueous solutions of acid potassium phthalate. . . Walter J. Hamer, Gladys D. Pinching, and S. F. Acree

pH values of aqueous solutions of acid potassium phthalate, National Bureau of Standards Standard Sample 84a, are given for concentrations from 0.001 to 0.2 *m* and for temperatures between 0° and 60°C. They were calculated from the values of the two dissociation constants of *o*-phthalic acid and the activity coefficients of the acid phthalate and phthalate ions. The pH values range from 3.88 to 4.42. They may be computed for any temperature from 0° to 60°C, inclusive, by the equation

$$\text{pH} = A^*/T + B + CT$$

or by the equation

$$\text{pH} = \text{pH}_{15} + k(t - 15)^2$$

where A^* , B , C , and k are constants whose numerical values are dependent upon the molality of the solutions, pH_{15} is the pH value at 15°C, and $T = t^\circ\text{C} + 273.16$.

A 0.05-*m* solution of acid potassium phthalate, the one used most extensively in the calibration of pH assemblies, has a pH value of 4.005 at 25°C. Its pH value at any temperature from 0° to 60°C, inclusive, may be computed by the equation

$$\text{pH} = 1336.08/T - 5.2678 + 0.016069T,$$

or by the equation

$$\text{pH} = 4.000 + 0.0000479 (t - 15)^2.$$

The pH values of a 0.05-*m* solution of acid potassium phthalate prepared with Stand-

ard Samples 84a and 84b were found to agree within 0.001 pH unit at the various temperatures.

Directions are included for preparations of the solutions on a molal and a molar scale of concentration. A critique of the method of evaluating the pH values and comparisons with older values reported for 0.05-*M* and 0.2-*M* solutions are given. 16 p. 5c.

RP1691. Extraction of alumina from clays and high-silica bauxites.

E. P. Flint, W. F. Clarke, E. S. Newman, Leo Shartsis, D. L. Bishop, and Lansing S. Wells

Two processes for extracting alumina from low-grade ores are described, one applicable to both clays and high-silica bauxites, and the other only to bauxites. In the former process, a line-containing sinter is prepared and annealed by cooling it slowly through the range of 1,300° to 1,200°C. The annealed sinter dusts to a powder which requires no grinding. This material is extracted with a solution containing about 200 g of Na₂CO₃ and 150 g of NaCl/liter, and an extract is obtained in which the concentration of Al₂O₃ is 70 to 80 g/liter and that of SiO₂, 1 to 2 g/liter. By boiling the extract with a seed charge of synthetic sodalite, 3Na₂O·3Al₂O₃·6SiO₂·2NaCl, its silica content is reduced to 0.1 percent of the alumina content or less. Alumina, suitable for the manufacture of aluminum by electrolytic reduction, is precipitated by passing carbon dioxide into the desilicated solution. About 95 percent of the alumina in the clay is recovered by this method.

The other process developed in this investigation involves the extraction of alumina from high-silica bauxites with sodium hydroxide-sodium chloride solution and recovery of soda and alumina from the residues by a modified soda-lime-sinter method. Recoveries in excess of 90 percent of the alumina in high-silica bauxites are obtained.

In cyclical operation of each process, the spent solution from the alumina-precipitation step is used in the treatment of a fresh batch of material.

When the bauxites are extracted with solutions containing mixtures of sodium hydroxide and sodium carbonate, sodium sulfate, sodium bromide, or sodium nitrate, the quantities of silica present in the extracts are lower, the higher the concentration of the salt. This is caused by the formation and increased stabilization of slightly soluble compounds related to sodalite. Comparisons of the X-ray diffraction patterns of various sodalite type compounds are presented. By the extraction of bauxite with sodium hydroxide solution, in the absence of added salts, a relatively soluble hydrated nephelite, Na₂O·Al₂O₃·2SiO₂·2H₂O, is formed, which has a crystal structure different from that of sodalite. 44 p. 10c.

RP1692. Stability of double-walled manganin resistors.....James L. Thomas

The international ohm is now maintained at the National Bureau of Standards by means of double-walled manganin resistors. It is assumed that the average resistance of a group of 10 standards, selected from a group of 24 constructed in 1933, remains constant with time. No one of the 10 standards has changed in resistance with reference to their average by more than 1 part in a million in 12 years. 4 p. 5c.

RP1693. Heat capacity of a two-phase system, with applications to vapor corrections in calorimetry.....Harold J. Hoge

A formula is derived that gives the heat capacity of a system composed of solid or liquid in equilibrium with saturated vapor in terms of the specific heat of the condensed phase and certain auxiliary data. This formula is valid throughout the entire range from 0 to 100 percent of vapor, and at the latter extreme reduces to a well-known relation between the specific heats of saturated liquid and saturated vapor.

The formula is applied to the calculation of vapor corrections in calorimetry. Its advantage lies in the fact that the correction is expressed as a single term that may be readily transformed with Clapeyron's equation, yielding two alternative correction formulas.

Vapor corrections to the heat capacity and to the heat of fusion are summarized and tabulated for four different experimental procedures in calorimetry. 8 p. 5c.

RP1694. A method for determining small amounts of gold, and its use in ascertaining the thickness of electrodeposited gold coatings....W. Stanley Clabaugh

This paper presents a method for the determination of the thickness of gold electroplate, using a punch and die to obtain samples of known small area. Amounts of gold up to 10 micrograms (0.010 mg), corresponding to a thickness of 0.00050 mm (0.00002 in.) or less on 1 mm² (0.00155 in.²) of surface, are determined directly by means of the color produced with *o*-tolidine. Results are reported for thicknesses of gold plate on experimentally plated samples and on commercially plated products. 9 p. 5c.

RP1695. Purification and properties of 29 paraffin, 4 alkylcyclopentane, 10 alkylcyclohexane, and 8 alkylbenzene hydrocarbons.
Alphonse F. Forziati, Augustus R. Glasgow, Jr., Charles B. Willingham, and Frederick D. Rossini

This report gives the results of the purification and measurements of refractive index (n_D at 20° and 25°C), density (at 20° and 25°C), boiling point and pressure coefficient of the boiling point (at 1 atm) and, except for four of the compounds, the freezing point, together with the calculated amount of impurity, of samples of 51 hydrocarbons, including 29 paraffins, 4 alkylcyclopentanes, 10 alkylcyclohexanes, and 8 alkylbenzenes. 8 p. 5c.

RP1696. Effect of some added materials on dicalcium silicate.

Edwin S. Newman and Lansing S. Wells

Studies of binary systems are helpful in the investigation of polycomponent systems forming industrial products, such as portland cement, dolomite refractories, or blast-furnace slags. Details are given of the application of differential heating and cooling curves to the determination of the temperature of the $\alpha \rightleftharpoons \beta$ inversion of $2\text{CaO} \cdot \text{SiO}_2$ in binary mixtures with CaO , SiO_2 , Al_2O_3 , MgO , Fe_2O_3 , CaF_2 , TiO_2 , BaO , Cr_2O_3 , B_2O_3 , Mn_2O_3 , V_2O_5 , P_2O_5 , Na_2O , and K_2O . These added materials, excepting CaO , lowered the temperature of the $\alpha \rightleftharpoons \beta$ inversion and estimates of the limits of solid solution in $\alpha\text{-}2\text{CaO} \cdot \text{SiO}_2$ are given. X-ray patterns of $\beta\text{-}2\text{CaO} \cdot \text{SiO}_2$ containing BaO , P_2O_5 , Na_2O , or K_2O indicated the existence of solid solutions of the substitution type. Observations were made of the effectiveness of the added materials in preventing dusting, which results from the $\beta \rightarrow \gamma$ inversion of $2\text{CaO} \cdot \text{SiO}_2$. It was found that Mn_2O_3 should be added to the list of known chemical inhibitors of dusting. 22 p. 10c.

RP1697. Reproducibility of the lead electrode and the electromotive force of the lead stick-lead amalgam cell at 0° to 60°C.

Roger G. Bates, Murray Edelstein, and S. F. Acree

The potentials of four types of solid lead electrodes with respect to saturated lead amalgam were obtained. Although lead anneals spontaneously, the surface condition has a profound effect upon the electromotive force. Untreated lead sticks were, in general, positive to lead the surface of which had been rendered strain-free. When etched in a mixture of nitric acid and lead nitrate, these lead sticks soon reached the same potential. Removal of air from the solutions improved the agreement among the electrodes.

Twelve sticks cast from National Bureau of Standards Standard Sample 49b and twelve cast from "spectroscopically pure" lead were etched and used to determine the difference of potential between stick lead and 8-percent lead amalgam at intervals of 5 degrees from 0° to 60°C. The results are given by the equation

$$E = 0.005347 + 0.0000201t,$$

where E is the electromotive force in international volts and t is in degrees centigrade. Thermodynamic constants were computed from the temperature coefficient of electromotive force. No difference was found between the two kinds of lead. 12 p. 5c.

RP1698. Engine tests with producer gas. Frederic A. Middleton and Clarence S. Bruce

Bench tests with a four-cylinder stationary engine were made with gasoline and producer gas from charcoal as the fuels. A comparison of their performance revealed that maximum power from producer gas from charcoal is about 55 percent of gasoline power, and that about 11.4 pounds of charcoal is equivalent to 1 gallon of gasoline. When operating an engine on producer gas the spark should be advanced beyond the setting for maximum power with gasoline. 14 p. 5c.

RP1699. Phase equilibrium relations in a portion of the system $\text{Na}_2\text{O}\text{-CaO}\text{-Al}_2\text{O}_3\text{-SiO}_2$Kenneth T. Greene and R. H. Bogue

A study of a portion of the system $\text{Na}_2\text{O}\text{-CaO}\text{-Al}_2\text{O}_3\text{-SiO}_2$ has been made as a step in the solution of the problem of the state of combination of Na_2O in portland cement clinker. Quenching data are given for compositions in the tetrahedron formed by $2\text{CaO} \cdot \text{SiO}_2$, CaO , $\text{Na}_2\text{O} \cdot \text{Al}_2\text{O}_3$, and Al_2O_3 , and phase diagrams are shown for three composition planes through the space model. Five invariant points were located approximately, at one of which $2\text{CaO} \cdot \text{SiO}_2$, $3\text{CaO} \cdot \text{SiO}_2$, $3\text{CaO} \cdot \text{Al}_2\text{O}_3$, and $\text{Na}_2\text{O} \cdot 0.8\text{CaO} \cdot 0.3\text{Al}_2\text{O}_3$ are in equilibrium with liquid. This point, which is not a eutectic, occurs at $1,440^\circ \pm 10^\circ\text{C}$ and has a composition of 3.5 percent Na_2O , 55.2 percent CaO , 31.0 percent Al_2O_3 , and 10.3 percent SiO_2 . Evidence was obtained of the formation, under favorable conditions, of a solid solution between $3\text{CaO} \cdot \text{Al}_2\text{O}_3$ and $\text{Na}_2\text{O} \cdot 0.8\text{CaO} \cdot 0.3\text{Al}_2\text{O}_3$ at temperatures below that of liquid formation. Present information indicates that Na_2O may be present in

clinker in several possible forms: (1) in glass, (2) as $\text{Na}_2\text{O} \cdot 0.8\text{CaO} \cdot 3\text{Al}_2\text{O}_3$ or a solid solution of this compound and $3\text{CaO} \cdot \text{Al}_2\text{O}_3$, (3) in solid solution in $2\text{CaO} \cdot \text{SiO}_2$, (4) as inclusions of a soda-bearing phase in $\beta\text{-}2\text{CaO} \cdot \text{SiO}_2$ produced by ex-solution on inversion from $\alpha\text{-}2\text{CaO} \cdot \text{SiO}_2$. 23 p. 10c.

RP1700. Spectrophotometric and colorimetric determination of the colors of the TCCA standard color cards.

Genevieve Reimann, Deane B. Judd, and Harry J. Keegan

The color cards of the Textile Color Card Association of the United States are widely used in the textile and allied industries and by many procuring agencies of the Federal Government. The Textile Color Card Association issues both seasonal and standard color cards. The seasonal cards provide a color-forecasting service to textile manufacturers and promote color coordination among the trades; the standard cards present colors for which there is a popular and continuing demand. Most important of the color cards is the Standard Color Card of America, the current ninth edition containing 216 colors. Preeminent among the many special sets of color cards issued by the Association for use of the Federal Government is the United States Army Color Card showing 22 official colors for the army and services. The specification of the colors of the Ninth Edition Standard Color Card and the United States Army Color Card has been undertaken for the purpose of correlating these textile standards with American War Standard Z44-1942 for the specification and description of color. The 238 samples comprising these color cards have been examined by basic spectrophotometric and colorimetric procedures. From this study there have been found daylight reflectance, Y , chromaticity coordinates (x, y), Munsell notations, and ISCC-NBS color designations for these samples, as recommended by American War Standard Z44-1942. As more than half of these textile standards are fluorescent, and as existing spectrophotometers are not suited to the evaluation of such samples, considerable reliance has been placed on quantitative colorimetric and photometric comparisons with the Munsell color standards, both by means of a chromaticity-difference colorimeter and by the Martens photometer.

As a closing check, Munsell book notations of these textile standards have been obtained by a direct visual comparison with the color scales of the Munsell Book of Color. 39 p. 15c.

RP1701. Wearing quality of experimental currency-type papers.

Frederick T. Carson and Merle B. Shaw

Fourteen groups of high-grade papers, differing in fiber composition, were made in the Bureau's experimental paper mill. Papers within the groups differed in the beating treatment of the pulp, in the surface-sizing treatment, and in the use or omission of melamine resin. Of the several kinds of fibers studied, carao mixed with cotton appears to approach most nearly the desirable characteristics associated with linen-content currency paper. The high-quality wood fibers available do not appear suitable for use in currency paper. Melamine resin in currency-type paper improves folding endurance, tensile and bursting strength, strength after crumpling, stretch, resistance to abrasion, and closure of the sheet. It greatly increases the strength of the paper when wet. However, it makes the dry paper somewhat easier to tear. 20 p. 10c.

RP1702. Heats of formation, hydrogenation, and combustion of the monoolefin hydrocarbons through the hexenes, and of the higher 1-alkenes, in the gaseous state at 25°C Edward J. Prosen and Frederick D. Rossini

For ethylene, propylene, the four butenes, the six pentenes, and the 17 hexenes, and all the higher 1-alkene hydrocarbons, in the gaseous state at 25°C , values are given for the heats of formation (from the elements solid carbon (graphite) and gaseous hydrogen), the heats of hydrogenation in the gaseous state, and the heats of combustion (in oxygen to form gaseous carbon dioxide and liquid water). The values for 2 of the pentenes, 14 of the 17 hexenes, and all the higher 1-alkene hydrocarbons, were calculated by a method involving correlation of the heat of hydrogenation with structure and the use of constants evaluated from the available experimental data on 4 butenes, 4 pentenes, 3 hexenes, and 1 heptene. 7 p. 5c.

RP1703. Studies of binary and ternary combinations of magnesia, calcia, baria, beryllia, alumina, thoria and zirconia in relation to their use as porcelains.

R. F. Geller, P. J. Yavorsky, B. L. Steierman, and A. S. Creamer

Specimens formed by pressing were heated and tested for absorption and shrinkage to determine the vitrification range. These pressed specimens represented the various oxides in simple binary and ternary combinations and also with minor additions of auxiliary oxides. Vitrified pieces were tested for strength in compression, thermal conduction and expansion, electrical resistance, dielectric properties, water

solubility, and resistance to attack by PbO liquid and vapor. Several compositions of unusual and valuable properties were disclosed. Phase relations were approximated by fusion tests and petrographic examinations of nonquenched samples. 36 p. 15c.

RP1704. Analysis of a standard sample of the carburetted water-gas type by laboratories cooperating with the American society for testing materials.

Martin Shepherd

This is a report of the analysis of a standard sample of carburetted water-gas by 24 laboratories in cooperation with Subcommittee VII of Committee D-3 of the American Society for Testing Materials. The data are presented in a series of frequency distribution plots, which show at a glance how the analyses compare with respect to each component of the gas mixture, as well as the calculated heating value and specific gravity. These plots form a clear picture of this type of gas analysis in this country. Although some very creditable work was reported, the need for some standardization is evident. 37 p. 15c.

RP1705. Spectrographic determination of boron in steel.

Charles H. Corliss and Bourdon F. Scribner

The spectrographic determination of small amounts of boron in thin steel rods and in massive pieces of steel was investigated by using several types of arc-like discharges. The sensitivity and accuracy in determining boron were found to be affected by variations in the rate of cooling of the electrodes. With $\frac{3}{32}$ -inch-rod electrodes, the high-voltage alternating-current arc permits determinations down to 0.0006 percent of boron, with an average deviation of ± 4 percent. With more massive specimens the high-voltage alternating-current arc is insensitive, but an over-damped condenser discharge or similar source provides adequate sensitivity and precision. Determinations as low as 0.0001 percent of boron are made with a direct-current arc to which sodium is added to suppress an interfering Fe II line. In the course of the investigation, a series of six boron steels in two sizes, $\frac{7}{32}$ - and $\frac{1}{2}$ -inch rods, were issued as National Bureau of Standards Standard Samples covering the range 0.0006 to 0.019 percent of boron. 14 p. 5c.

RP1706. Hygroscopicity of optical glasses as an indicator of serviceability.

Donald Hubbard

Several modifications of a powder-hygroscopicity method have been tried as a rapid means of determining the serviceability of optical glasses, i. e., their ability to maintain a clear polished surface under normal conditions of service. The method has been applied to a wide variety of glasses, and it shows the typical optical glasses in common use to be much less hygroscopic than the average commercial sheet and container glasses. In fact, many of the optical glasses even compare favorably with the better chemical laboratory wares, such as Pyrex, Tamworth, and Kimble N-51-a. This grouping of these glasses of such very dissimilar chemical durabilities serves well to emphasize that the capacity of a glass to maintain a clear surface upon exposure to the atmosphere, and its chemical durability as conventionally determined are two inherently different properties. A comparison of the hygroscopicity values of the Corning 015 electrode glass with those of the optical and chemical ware glasses whose electrode capacity is very poor suggests strongly that the pH response of a glass is primarily a function of its hygroscopicity. Tests made on a limited number of glasses of the binary series $\text{Na}_2\text{O-SiO}_2$, $\text{K}_2\text{O-SiO}_2$, $\text{Li}_2\text{O-SiO}_2$, and $\text{PbO-B}_2\text{O}_3$ appear to reflect some of the critical compositions of the respective phase equilibrium diagrams. 11 p. 5c.

RP1707. Solubility of cadmium sulfate in $\text{H}_2\text{O-D}_2\text{O}$ mixtures.

Langhorne H. Brickwedde

The work reported here is a continuation of earlier studies on the effect of heavy water on the electromotive force of standard cells.

The solubility of cadmium sulfate was measured in heavy water and in normal water. This salt was found to be about 8 percent less soluble in heavy water than in normal water in the temperature range -1° to $+70^\circ\text{C}$.

At 43.6°C , $\text{CdSO}_4 \cdot 8/3\text{H}_2\text{O}$, $\text{CdSO}_4 \cdot \text{H}_2\text{O}$, and saturated H_2O solution are in equilibrium. $\text{CdSO}_4 \cdot 8/3\text{D}_2\text{O}$, $\text{CdSO}_4 \cdot \text{D}_2\text{O}$, and saturated D_2O solution are in equilibrium at 45.4°C . 7 p. 5c.

RP1708. A glossmeter for smoothness comparisons of machine-finished surfaces.

Richard S. Hunter

As shininess is one indication of surface smoothness, a photoelectric glossmeter was developed for possible use as a production-inspection device for evaluating the roughness of fairly coarse machine-finished surfaces. A near-grazing angle, 75 degrees, was chosen for the measurement of gloss. Therefore, specimens of the type having narrow ridges of metal between adjacent tool cuts are rated low in gloss, or *rough*.

Although the glossmeter essentially measures the fraction of the unshadowed surface that is nearly parallel to mean surface, the instrument resulting from the present development has proved to be a simple and useful device for making rapid comparisons of the roughness of surfaces machined with about the same feeds. 7 p. 5c.

RP1709. Absorption and scattering by sound-absorbent cylinders.

Richard K. Cook and Peter Chrzanowski

The absorption and scattering of a plane wave of sound by an infinitely long circular cylinder whose axis is perpendicular to the direction of propagation of the wave are calculated. The surface of the cylinder is assumed to have a known normal acoustic impedance. The calculations take account of diffraction effects. Absorption measurements were made on long cylinders placed in a reverberation room, where the incident wave directions are at all angles to the axes of the cylinders, and were compared with the calculated values. In order to make the comparison, the reverberation-room statistics appropriate for cylinders (which are different from the statistics for flat patches of absorbent material) are developed and applied. The theory predicts, and measurements confirm, that absorbent cylinders can have coefficients of absorption greater than unity. Fairly good agreement between the calculated and measured coefficients is found. The reverberation-room statistics appropriate for spherical absorbers are also developed, although no measurements were made on spheres. 18 p. 10c.

RP1710. Dynamic tensile tests of parachute webbing.

Ambrose H. Stang, Martin Greenspan, and Sanford B. Newman

Dynamic-load-stretch and stretch-energy data were obtained for two types of nylon and one type of cotton parachute webbing. These data were compared with similar data obtained from static tensile tests of the materials. The dynamic and static breaking strengths of the webbing were also obtained.

The nylon specimens showed a reduced strength, stretch, and capacity for energy absorption under dynamic loading as compared with static loading. The cotton specimens showed under dynamic loading about the same strength, reduced stretch, and increased energy absorption. The energy absorbed by the broken nylon specimens was more than three times that of the broken cotton specimens. 9 p. 5c.

RP1711. Note on the density and heat of combustion of benzoic acid. . . R. S. Jessup

The results of various determinations of the density of benzoic acid are summarized. The three most recent values are in reasonably good agreement with each other, but are higher by about 4.5 percent than the value most commonly referred to in the literature. The difference of 4.5 percent in density affects the reduction of weight in air to mass by an amount corresponding to 0.004 percent in mass, and in heat of combustion per gram mass. 3 p. 5c.

RP1712. An analysis of the effects of fuel distribution on engine performance.

Donald B. Brooks

From an empirical equation, based on single-cylinder-engine test data and relating engine power to fuel consumption, engine-performance curves are derived analytically for typical examples of poor mixture distribution. Investigation of the resulting information shows that the minimum specific fuel consumption is a satisfactory criterion of distribution quality. A method is developed for ascertaining the attainable improvement over a given distribution. 15 p. 5c.

RP1713. Effects of mildew on vegetable-tanned strap leather.

Joseph R. Kanagy, Arbelia M. Charles, Edward Abrams, and Rees F. Tener

Samples of vegetable-tanned strap leather were exposed to conditions favorable for mildew growth in a tropical room at Fort Belvoir, Va., and in soil burial beds and in a humidity cabinet at the National Bureau of Standards. Mildew under these conditions varied from moderate to very heavy growth.

Physical tests showed that the growth of mildew on leather increased its stiffness, caused a loss in tensile strength, decreased stretch at the breaking point, and weakened the grain surface. Chemical tests revealed a loss of grease, water solubles, glucose, tannins, and nontannins.

No appreciable deterioration of the hide substance was indicated by the tests. The change in physical properties appeared to be due to the mildew activity impairing principally the outer surface of the leather.

The molds in assimilating the grease bring about decomposition (decarboxylation) of the fatty acids. This is shown by a decrease in the saponification number.

Samples of leather containing a fungicidal oil having as active ingredients a mixture of paranitrophenol and pentachlorophenol in equal proportions and aged under

the same conditions as the untreated leathers showed no evidence of mildew after 12 weeks. 14 p. 5c.

RP1714. Heats of combustion and formation at 25°C of the alkylbenzenes through $C_{10}H_{14}$, and of the higher normal monoalkylbenzenes.

Edward J. Prosen, Walter H. Johnson, and Frederick D. Rossini

Values are given for the heats of combustion (in oxygen to form gaseous carbon dioxide and liquid water) and the heats of formation (from the elements, solid carbon (graphite) and gaseous hydrogen), at 25°C, for benzene, toluene, the four C_8H_{10} , the eight C_9H_{12} , and the 22 $C_{10}H_{14}$ alkylbenzenes, in both the liquid and gaseous states, and for the higher normal monoalkylbenzenes in the gaseous state. 7 p. 5c.

RP1715. Heats of combustion of four cyclopentane and five cyclohexane hydrocarbons... Walter H. Johnson, Edward J. Prosen, and Frederick D. Rossini

The heats of combustion of cyclopentane, methylcyclopentane, ethylcyclopentane, *n*-propylcyclopentane, cyclohexane, methylcyclohexane, ethylcyclohexane, *n*-propylcyclohexane, and *n*-butylcyclohexane were measured with a bomb calorimeter. The following values were obtained for $-\Delta H_c^{\circ}_{298.16}$, the heat of combustion at 25°C and constant pressure of the liquid hydrocarbon in gaseous oxygen to form gaseous carbon dioxide and liquid water, with all the reactants and products in their thermodynamic standard reference states, in international kilojoules per mole (with the corresponding value in terms of the conventional thermochemical calorie being given in parentheses):

Cyclopentane, 3290.34 ± 0.72 (786.54 ± 0.17)
Methylcyclopentane, 3937.07 ± 0.75 (941.14 ± 0.18)
Ethylcyclopentane, 4591.17 ± 0.94 (1097.50 ± 0.22)
n-Propylcyclopentane, 5244.75 ± 1.18 (1253.74 ± 0.28)
Cyclohexane, 3919.26 ± 0.70 (936.88 ± 0.17)
Methylcyclohexane, 4564.52 ± 0.95 (1091.13 ± 0.23)
Ethylcyclohexane, 5221.71 ± 1.46 (1248.23 ± 0.35)
n-Propylcyclohexane, 5874.79 ± 1.15 (1404.84 ± 0.27)
n-Butylcyclohexane, 6529.21 ± 1.22 (1560.78 ± 0.29).

5 p. 5c.

RP1716. Size grading of diamond powder.

B. L. Steierman, H. Insley, and W. H. Parsons

A study has been carried out on certain aspects of diamond-powder grading. Various liquids were tried as dispersing media, and of the 30 materials tested, gelatin solution was found to be the best. Several methods of separating the powder into size fractions were investigated and are discussed. The Cooke short-column elutriator was found satisfactory for determining the size of large quantities of powder with little manual attention. Results of size fractionation are shown by photomicrographs. 10 p. 5c.

RP1717. Precision of telescope pointing for outdoor targets.

Francis E. Washer and Helen Brubaker Williams

The probable error of a single pointing (PE_s) is measured for a single telescope with a variety of targets. This investigation shows that, although some change in PE_s with distance does occur, the distribution of PE_s as a function of distance can usually be neglected and a value of 0.62 second assigned as a practical average. The values of PE_s for an indoor target usually show a small variation from one experienced observer to another, and from right to left eye of the same observer. There is also a measurable systematic difference in pointing between the right eye and the left eye of the same observer. In outdoor pointing, a long-period error or drift is usually superposed upon the short-period errors. 10 p. 5c.

RP1718. Crystallization of unvulcanized rubber at different temperatures.

Lawrence A. Wood and Norman Bekkedahl

The crystallization and melting of unvulcanized natural rubber in the unstretched state have been investigated at different temperatures. Change of volume has been used as a quantitative measure of the extent of crystallization, and mercury-filled dilatometers containing the rubber have been used for the volume measurements.

Crystallization was observed to occur at temperatures between -50° and $+15^\circ\text{C}$ and to be most rapid at about -25°C . The final decrease of volume on crystallization was usually found to lie between 2.0 and 2.7 percent.

The melting of the crystalline rubber was found to occur over a range of temperature and to be strongly dependent on the temperature at which the crystals were formed. The temperature at which the beginning of melting occurs is from

4 to 7 degrees above the temperature of crystallization. The range of melting is about 35 degrees at the lowest temperatures and decreases to about 10 degrees at the highest. The same range of temperature of melting is obtained regardless of the extent of the crystallization. 22 p. 10c.

RP1719. Hygroscopicity and electrode function (pH response) of glasses as a measure of serviceability.....Donald Hubbard

The pH responses of electrodes prepared from glasses of widely different composition have been compared with the hygroscopicity of the glasses. The resulting data indicate that glasses of low hygroscopicity, such as the chemical glasswares and common types of optical glasses, give pH responses that fall appreciably below the theoretical predicted from the Nernst equation and are incapable of producing satisfactory electrodes. Further, electrodes blown from glasses of intermediate hygroscopicity, such as the common bottle and sheet glasses, give pH responses more nearly approximating the theoretical, whereas the Corning 015 glass, whose superior pH response places it in a class by itself, has a very high hygroscopicity. These results strongly support the belief that adequate hygroscopicity is one of the primary factors in determining the suitability of a glass for pH measurements. The data also suggest that the pH response might well be used as a rapid test for the serviceability of optical glasses, i. e., the ability to maintain a clear polished surface upon exposure to the atmosphere. For this purpose it is necessary to determine the pH response over a range in which the "chemical durability" of the glass remains constant in order to avoid the voltage anomalies that accompany durability changes. 10 p. 5c.

RP1720. Fineness test of molding sand. .Margaret Price and Alexander I. Krynsky

It is recognized that the present American Foundrymen's Association sand fineness-test method is not entirely satisfactory since sands with the same AFA classification may have different properties. In view of this fact other methods have been proposed, but in general little was published on this subject. The need for more data has prompted the present investigation. The object of this study was to evaluate the merits of the regular pipette, the Andreasen pipette, and the hydrometer methods in making fineness determinations on Albany and Lumberton molding sands. The hydrometer method which was described in detail in the paper was found to be preferable because it yields satisfactory results conveniently with a minimum expenditure of time for the operator. 21 p. 10c.

RP1721. Effect of sodium chloride on the apparent ionization constant of boric acid and the pH values of borate solutions.

George G. Manov, Nicholas J. DeLollis, Phoebe W. Lindvall, and S. F. Acree

The pH values for solutions of borax (sodium tetraborate decahydrate) and sodium chloride were determined from 0° to 60°C by the method of cells without liquid junction. In one series, the effect of sodium chloride on the apparent ionization constant of boric acid was determined by measurements of cells in which the concentration of borax was maintained constant (0.01*m*) while that of the sodium chloride was varied. In a second series, the pH values of various concentrations of borax in 0.01-*m* sodium chloride were measured, and in a third, similar measurements were made of solutions containing 0.025-*m* borax with a variable concentration of chloride.

The values of other investigators for the pH of solutions of borax in which cells with liquid junctions were involved are compared with those currently reported. Some of these are modified to take cognizance of present-day views concerning electrolytic dissociation.

A 0.01-*m* solution of borax (3.81 g of borax per liter of solution) is recommended for the calibration of pH equipment. The equation

$$\text{pH} = 2331.7/T + 0.017433T - 3.840,$$

where *T* is the absolute temperature, represents the pH values for this solution from 0° to 60°C. 16 p. 5c.

RP1722. Heats, equilibrium constants, and free energies of formation of the monoolefin hydrocarbons.

John E. Kilpatrick, Edward J. Prosen, Kenneth S. Pitzer, and Frederick D. Rossini

For ethylene, propylene, each of the four butenes, six pentenes, and 17 hexenes, and for the higher normal 1-alkenes, values are presented for the following thermodynamic properties to 1,000° or 1,500°K: The heat of formation from the elements, ΔH_f° ; the free energy of formation from the elements, ΔF_f° ; and the logarithm of the equilibrium constant of formation from the elements, $\log_{10} K_f$. For each of the 6 pentenes and 17 hexenes, values are also given to 1,000° or 1,500°K, for the following prop-

erties: The heat-content function, $(H^\circ - H_0^\circ)/T$; the free-energy function, $(F^\circ - H_0^\circ)/T$; the entropy, S° ; the heat content, $H^\circ - H_0^\circ$; and the heat capacity, C_p° .

Equilibrium constants and concentrations are given in tabular and graphical form for the isomerization of the 4 butenes, 6 pentenes, and 17 hexenes, as a function of the temperature to 1,000° or 1,500°K. Equilibrium constants are also given in tabular and graphical form for some reactions of hydrogenation, dimerization, and alkylation. 54 p. 10c.

Title page and contents for volume 36. 7 p. 5c.

RESEARCH PAPERS FROM JOURNAL OF RESEARCH OF THE NATIONAL BUREAU OF STANDARDS, VOLUME 37, JULY—DECEMBER 1946

RP1723. Radio proximity fuze design. Wilbur S. Hinman, Jr., and Clelio Brunetti

The general principles governing the design of radio proximity fuzes are presented. The paper deals primarily with fuzes for smooth-bore projectiles, such as bombs, rockets and mortars. Illustrations and descriptions of the various fuzes in this category which were developed during World War II are given. Within security regulations, there is a reasonably detailed discussion of the performance and construction of fuze components, such as the oscillator, the amplifier, the antennas, the power supply and the safety and arming mechanisms. There is also a brief description of production practices and problems and methods of inspection and quality control. 13 p. 10c.

RP1724. Assembly, testing, and operation of laboratory distilling columns of high efficiency. . . . Charles B. Willingham and Frederick D. Rossini

A description is given of the assembly, testing, and operation of the laboratory distilling columns used at the National Bureau of Standards in the work of the American Petroleum Institute Research Project 6 on the analysis and purification of hydrocarbons and in the work on the preparation of NBS Standard Samples of hydrocarbons. The following topics are covered: Assembly of distilling columns, including pot, rectifying section, jacket, head, reflux regulator, receiving assembly, electrical heating system, thermometric systems, and controlled-pressure system; testing of distilling columns, including test mixtures and results; and operation of columns, for both regular and azeotropic distillations. Drawings of the equipment and apparatus are given, including the arrangement of the 15 distilling columns, measuring instruments, and auxiliary equipment in the distillation room. A view of the distillation room is given. 15 p. 10c.

RP1725. Nickel plating on steel by chemical reduction.

Abner Brenner and Grace E. Riddell

A process has been developed for the production of adherent nickel deposits of good quality on steel without the use of an electric current. The deposition of nickel is brought about by chemical reduction of a nickel salt with hypophosphites in a hot ammoniacal solution. The reaction is catalytic and, under the prescribed conditions of concentration and pH, no reduction occurs in the solution unless certain metals, such as steel or nickel, are introduced into the bath. The reduction then occurs only at the surface of the immersed metal with the production of a coating of nickel of 96 to 97 percent purity. 4 p. 5c.

RP1726. Temperature coefficients for proving rings.

Bruce L. Wilson, Douglas R. Tate, and George Borkowski

Proving rings for calibrating testing machines are not compensated for change in elastic properties and dimensions with temperature. For this reason, temperature-correction factors must be used in computing ring loads from deflections obtained at temperatures that differ from the temperature of calibration. Temperature coefficients for 14 representative rings were computed from calibration results obtained at temperatures of 70° and 100° F. The temperature coefficient of one ring for the range + 70° to - 93°F was determined from measurements of the natural frequencies at these temperatures. The temperature coefficient of a proving ring is shown to be equal to the temperature coefficient of Young's modulus of elasticity plus twice the coefficient of thermal expansion of the material of the ring. 7 p. 10c.

RP1727. Mutarotation and ring structure of mannuronic lactone.

Horace S. Isbell and Harriet L. Frush

The numerous commercial applications of algin, a polysaccharide derived from certain marine plants, makes important the study of its principal constituent, D-mannuronic lactone. In this paper it is shown that by oxidation with bromine mannosaccharic dilactone of known structure is formed directly from mannuronic lactone without change in ring structure, and hence the latter substance, like mannosaccharic

dilactone, has a bicyclic structure consisting of two butylene oxide rings. The initial rapid mutarotation reaction of the substance is shown to consist of a conversion of the beta furanose modification to an equilibrium mixture containing the alpha furanose, and a detectable amount of the aldehyde modification. There is a small but measurable displacement of equilibrium with change in temperature. The mutarotation is exceptionally sensitive to basic catalysts and for this reason the point of minimum rate lies in the acid region at pH 3.1. 7 p. 5c.

RP1728. Heats of formation and combustion of the normal alkylcyclopentanes and cyclohexanes and the increment per CH_2 group for several homologous series of hydrocarbons.

Edward J. Prosen, Walter H. Johnson, and Frederick D. Rossini

Values are presented for the heats of formation and combustion at 25°C for the normal alkylcyclopentanes and the normal alkylcyclohexanes, in the liquid state through normal butyl and in the gaseous state through normal hexadecyl, with equations to yield values for all the higher members of both series in the gaseous state.

The increment per CH_2 group is compared for the lower members of several normal alkyl homologous series, including paraffins, monoolefins (1-alkene), alkylbenzenes, alkylcyclopentanes, alkylcyclohexanes, and alkyl acetylenes (1-alkyne). 6 p. 5c.

RP1729. Preliminary description and analysis of the first spectrum of uranium.

C. C. Kiess, Curtis J. Humphreys, and Donald D. Laun

Observations of the spectra emitted by uranium under arc and spark excitation have afforded a separation of the lines of neutral atoms from those emitted by ions. A list of more than 9,000 lines with accurate wavelengths, wave numbers, and estimated intensities, for the region 2900 Å to 11000 Å, has been compiled as descriptive of the spectrum of the neutral atom. About 2,000 of these lines have been classified as combinations between 18 low and metastable odd energy levels with about 280 high even levels. Well-resolved Zeeman patterns give g-values for several low levels that identify them as components of ^5L , ^5K , ^7M , and ^7K terms arising in the electron configurations f^3ds^2 and f^3d^2s . The spectrum of uranium is interpreted as that of a rare-earth element analogous to neodymium, uranium being the third member of a second group of rare earths beginning with thorium. From the fact that uranium is easily ionized in electric arcs and magnetic fields, and also that the short-wave limit of the observed spectrum does not extend below 2900 Å, it is concluded that the ionization potential of neutral uranium atoms is approximately 4 volts. 16 p. 10c.

RP1730. Viscosity and the extraordinary heat effects in glass.... Arthur Q. Tool

In accordance with experience concerning the behavior of glass at temperatures within its annealing range, an equation is proposed that relates the various extraordinary heat effects to the inelastic deformability and to the degree of superheating or undercooling. By using this equation in connection with the thermal-expansion curves of a glass within its annealing range, certain constants that are related to the coefficient of viscosity and its changes with temperature and the degree of superheating or undercooling have been determined with reasonable results. Such results make it possible to estimate the inelastic deformability of a glass in its various conditions at all annealing temperatures and are, therefore, valuable in connection with problems that are encountered in the process of annealing glass. The apparent success achieved in applying the proposed equation to experimental data suggests that the concepts underlying this equation are fundamental and must be considered in any theory concerning the constitution of glass or that of any other extremely viscous liquid. 18 p. 10c.

RP1731. An arrangement with small solid angle for measurement of beta rays.

Leon F. Curtiss and Burrell W. Brown

An arrangement using a Geiger-Müller counter with small aperture with a radioactive source at some distance from it is described for counting beta particles. Sources emitting only beta rays with maximum energies above 1 million electron volts of the order of 1 millicurie can be measured in terms of the disintegration rate from the observed counting rate and the solid angle as calculated from the dimensions of the apparatus. An independent check of the arrangement shows that this can be done reliably. A suggestion for discarding the use of the curie and substituting a unit consisting of 10^6 disintegrations per second to be called the "rutherford" is made. The curie is properly applicable only to members of the radium family. 4 p. 5c.

RP1732. Heats, equilibrium constants, and free energies of formation of the alkylbenzenes.

William J. Taylor, Donald D. Wagman, Mary G. Williams, Kenneth S. Pitzer, and Frederick D. Rossini

For benzene, toluene, ethylbenzene, the three xylenes, normal and isopropylbenzene, the three methylethylbenzenes, the three trimethylbenzenes, and the higher normal alkylbenzenes, values are presented for the following thermodynamic properties for the gaseous state to 1,500°K: The heat-content function, $(H^\circ - H_0^\circ)/T^\circ$; the free-energy function, $(F^\circ - H_0^\circ)/T^\circ$; the entropy, S° ; the heat content, $H^\circ - H_0^\circ$; the heat capacity, C_p° ; the heat of formation from the elements, ΔH_f° ; the free energy of formation from the elements, ΔF_f° ; and the logarithm of the equilibrium constant of formation from the elements, $\log_{10} K_f$.

Equilibrium constants and concentrations are given in tabular and graphical form for the isomerization of the four C_8H_{10} alkylbenzenes and for the eight C_9H_{12} alkylbenzenes as a function of the temperature to 1,500°K. Equilibrium constants are also given in tabular and graphical form for some reactions involving alkylation (addition of olefin to benzene to form alkylbenzene), cyclization (conversion of paraffin to alkylbenzene plus hydrogen), and trimerization (of acetylene to form benzene and of methylacetylene to form 1,3,5-trimethylbenzene). 28 p. 15c.

RP1733. A study of the damaging effect of fatigue stressing on SAE X4130 steel.

John A. Bennett

The damaging effect of fatigue stressing above the endurance limit was investigated with notched specimens of SAE X4130 steel. The damage was measured by the decrease in endurance at another stress. A deflection method for detecting the formation of a fatigue crack permitted the damage measurement to be limited chiefly to the precrack stage. The results showed that the apparent rate of damage depends on the stress history. If the prestress is higher than the test stress, the damage occurs rapidly at first, then more slowly. The reverse is true if the damaging stress is lower than that used to measure the damage.

Tests also were made with smooth specimens in an effort to determine the cumulative damage caused by fatigue at more than one stress. Two methods were developed for extrapolating to determine the point at which fatigue cracking starts, so the damaging cycle ratios could be based on the life of the specimens prior to cracking. Complete $S-N$ curves were determined for specimens after each of eight different damaging treatments. With these curves a method of expressing damage was developed that permitted the direct addition of damage occurring at different stresses. The reliability of this method was checked by testing specimens after fatigue loading at two or more different stresses and comparing the results with predictions based on the addition of the indicated damage. The agreement was within the experimental error. 17 p. 10c.

RP1734. Purification, purity, and freezing points of 31 hydrocarbons of the API-NBS series.

Augustus R. Glasgow, Jr., Evelyn T. Murphy, Charles B. Willingham, and Frederick D. Rossini

This report describes the purification and determination of freezing points and purity of 31 hydrocarbons of the API-NBS series, including 2 pentanes, 5 hexanes, 2 heptanes, 1 octane, 3 alkylcyclopentanes, 3 alkylcyclohexanes, and 15 alkylbenzenes. 5 p. 10c.

RP1735. Absorption measurements for broad beams of 1- and 2-million-volt X-rays.

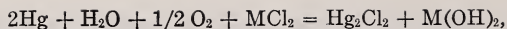
George Singer, Carl B. Braestrup, and Harold O. Wyckoff

Experimentally determined concrete-absorption curves are given for wide-angle X-ray beams produced by a 1- and 2-million-volt resonance generator. Data on the variation of X-ray intensity with the distance from a concrete barrier are included. With this information as a basis, the thickness of a concrete barrier necessary for protection against a broad X-ray beam has been computed for 1- and 2-million-volt X-rays and for various tube currents and barrier-to-target distances. 4 p. 10c.

RP1736. Effect of reaction between mercury and oxygen upon polarographic waves of certain metals at small concentrations.

Edgar Reynolds Smith, John Keenan Taylor, and Roberta Evelyn Smith

Polarographic waves of certain metals, notably of lead, zinc, copper, cobalt, and nickel in dilute neutral solutions, diminish progressively with time in the presence of mercury and air. This behavior is not to be explained by adsorption, as has previously been supposed, but by a reaction between mercury, water, oxygen, and the ions of the metallic salt which, in some instances, precipitates the metal from solution in the form of its hydroxide. This reaction is



in which M represents the metal. Recognition of this reaction and precautions to exclude it are essential for accurate polarographic determinations of small amounts of heavy metals. 5 p. 10c.

RP1737. Theory for axial rigidity of structural members having ovaloid or square perforations.....Martin Greenspan

Formulas are derived for computing the over-all lengthening (or shortening) of a tension (or compression) member having a uniform gross cross section and a series of similar perforations of approximately ovaloid or approximately square shape uniformly distributed along the length. 5 p. 10c.

RP1738. Heat content, free-energy function, entropy, and heat capacity of ethylene, propylene, and the four butenes to 1,500°K.

John E. Kilpatrick and Kenneth S. Pitzer

Values are presented for the following thermodynamic properties for ethylene, propylene and the four butenes, in the ideal gaseous state, to 1,500°K: heat-content function, $(H^\circ - H_0^\circ)/T$; free-energy function, $(F^\circ - H_0^\circ)/T$; entropy, S° ; heat content, $(H^\circ - H_0^\circ)$; heat capacity, C_p° . 9 p. 10c.

RP1739. A simple cyclic falling-film molecular still.John Keenan Taylor

The efficient cyclic falling-film molecular still described is characterized by simplicity of operation and ease of construction. The liquid to be distilled is pumped from the reservoir and introduced on the vertical cylindrical evaporator by an annular orifice. The resulting uniform distribution of the distilland, together with the short column used, makes for efficient operation. The apparatus may be used for charges of liquid ranging from a minimum of about 10 ml to 1 liter or more. 4 p. 5c.

RP1740. A study of resinous sealants for porous metal castings. .Vernon C. F. Holm

The repair of porous castings by sealing with liquid synthetic resins was investigated. The sealing efficiencies of fourteen resins were determined on porous bushings of aluminum, a copper-silicon alloy, and a red brass, impregnated by the vacuum-pressure method. Tests were made to determine the durability of the two most promising sealants by exposing specimens sealed with these resins to hot motor oil, high octane gasoline, boiling water elevated temperatures, high pressures, and thermal shock. The results suggest that this procedure for rendering porous castings pressure tight may be permissible in emergencies but that, in general, the foundryman should exert every effect to produce non-porous castings instead of trying to remedy porosity. 6 p. 10c.

RP1741. Testing large-capacity rotary gas meters.

Howard S. Bean, Matthew E. Benesh, and Frank C. Witting

The paper describes two methods of testing rotary gas meters of large capacity. In one method, known as the field test method, the necessary equipment is taken to the meter location. In the other method, termed the "transfer method," the test is made in a shop where conditions can be controlled more closely. Results obtained by the two methods are compared.

Tests made to study the instantaneous pressures within the closed measuring pockets of rotary meters and the effect of pulsations at the meter inlet are described, and the results discussed. 27 p. 15c.

RP1742. Poisson's ratio of some structural alloys for large strains.

Ambrose H. Stang, Martin Greenspan, and Sanford B. Newman

Values of Poisson's ratio, as well as ordinary stress-strain properties, for tensile strains as high as 18 percent, were determined on sheets of aluminum alloys 24ST and 24SRT, chrome-molybdenum steel plate, and structural and fully killed low-carbon steel plate. 11 p. 10c.

RP1743. Electrode function (pH response) of potash-silica glasses. .Donald Hubbard

The electrode function (pH response) of a series of potash-silica ($\text{K}_2\text{O}-\text{SiO}_2$) glasses was determined and a comparison made with the hygroscopicity of the glasses. All the $\text{K}_2\text{O}-\text{SiO}_2$ glasses investigated showed a very high hygroscopicity, with an accompanying sensitive pH response. However, between pH 2 and 4, glasses of 71.8 and 73.6 percent SiO_2 gave pH-response values higher than the 59 millivolts per pH predictable from the Nernst equation.

Electrodes prepared from all members of the series demonstrated large voltage departures from the straight-line relation with increasing alkalinity of the buffer solutions. For a glass of 75.76 percent SiO_2 content, the voltage departures were compared with the chemical durability of the glass and also with the sodium-ion concentration,

[Na⁺], of the Britton-Robinson universal buffer solutions used. The voltage departures correlated with the magnitude of the attack much more convincingly than with the pNa.

For several chosen pH values, the voltage departures for the electrodes of these glasses when plotted with reference to their SiO₂ content gave curves that indicated a sharp change in slope near 74 percent of silica. A corresponding change in slope was also shown by the hygroscopicity-percentage-silica curve. 6 p. 10c.

RP1744. Purification and sealing "in vacuum" of National Bureau of Standards Standard Samples of hydrocarbons.

Beveridge J. Mair, Domenic J. Termini, Charles B. Willingham, and Frederick D. Rossini

This report describes the procedure and apparatus used in the purification and sealing "in vacuum" of 19 National Bureau of Standards Standard Samples of hydrocarbons, including 9 paraffins, 3 cycloparaffins, and 7 alkylbenzenes. 8 p. 10c.

RP1745. Thermal-expansion stresses in reinforced plastics.....Philip S. Turner

Failure of adhesive bonds is attributed to boundary stress concentrations. An analysis of the causes of internal-stress concentrations in rigid adhesive layers leads to the conclusion that stress concentrations can be eliminated in many cases by matching the coefficients of thermal expansion of the component parts. A stress-equilibrium formula for calculating the thermal-expansion coefficients of mixtures involves the density, modulus of elasticity, coefficient of thermal expansion, and proportion by weight of the ingredients. Illustrations of the application of the derived formula include lead-antimony and beryllium-aluminum mixtures, phenol-formaldehyde resin and glass-fiber mixtures, and plastic plywoods. The thermal-expansion coefficients of a number of pure and reinforced plastics are reported. Bonds obtained when thermal coefficients are matched are stable over a wide temperature range. 12 p. 10c.

RP1746. Salt effects of potassium nitrate, sodium sulfate, and trisodium citrate on the activity coefficients of *p*-phenolsulfonate buffers.

Roger G. Bates, Pauline T. Diamond, Murray Eden, and S. F. Acree

Electromotive-force measurements of cells without liquid junction that contained hydrogen and silver-silver-chloride electrodes and alkaline *p*-phenolsulfonate buffers with added salts of different valence types were made from 0° to 60°C. The 63 buffer solutions studied were prepared by the partial neutralization of potassium *p*-phenolsulfonate with sodium hydroxide, and each contained approximately equal molal amounts of potassium *p*-phenolsulfonate and of potassium sodium *p*-phenolate sulfonate. These solutions were classified into five series on the basis of the kind of added salt and the ratio, *R*, of its molality to the molality of each buffer salt, as follows: Potassium nitrate, *R* = 1; sodium sulfate, *R* = 1; sodium sulfate, *R* = 0.5; barium chloride, *R* = 0.5; trisodium citrate, *R* = 0.33. All the buffers, with the exception of the series to which barium chloride was added, likewise contained sodium chloride, *R* = 1. The ionic strengths of the solutions varied from 0.05 to 0.8.

The values of the second dissociation constant of *p*-phenolsulfonic acid given in an earlier paper were confirmed. The influence of potassium nitrate, sodium sulfate, and trisodium citrate on the activity coefficient term, $f_{C_1}f_{HPs}/f_{Ps}$, in which *f* represents an activity coefficient on the molal scale and the subscripts represent respectively chloride ion and the primary and secondary anions of the buffer, was determined for solutions containing no sodium chloride at 0° to 35°C. No pronounced differences in character were observed among the effects of the salts of the three valence types in concentrations sufficient to make up one-fifth of the ionic strength of the mixture. 11 p. 10c.

RP1747. Equilibrium constants of some reactions involved in the production of 1,3-butadiene..Ferdinand G. Brickwedde, Morris Moskow, and John G. Aston

Thermodynamic functions including free energy, enthalpy, entropy, and specific heat, are given for the compounds butadiene, benzene, cyclohexane, ethane, ethylene, ethyl alcohol and water and for the elements carbon (graphite), hydrogen and oxygen. From these are calculated and tabulated values of equilibrium constants for reactions of interest in connection with the production of 1,3-butadiene for synthetic rubber. Comparisons are made between table values and available experimental data on equilibrium constants, gaseous specific heats and entropies. The cracking of hydrocarbons is discussed and the importance of reaction rates in determining the amounts of reaction products is noted. 16 p. 10c.

RP1748. Effect of catalysts and pH on strength of resin-bonded plywood.
Gordon M. Kline, Frank W. Reinhart, Royden C. Rinker, and Nicholas J. DeLollis

The effects of various catalysts used to cure the resinous adhesives on the strength properties of plywood were investigated, particularly with regard to the degree of acidity developed by the catalysts in the resin film and in the plywood. The flexural, impact, and shear strengths, both initially and after aging, of birch plywoods bonded with urea-formaldehyde and phenol-formaldehyde resins definitely decrease as the acidity of the plywood increases, as evidenced by a decrease in pH. Only in the case of plywood bonded with casein and urea-formaldehyde resins had the deterioration at the bond progressed sufficiently in the roof-agent tests to make it impossible to carry out strength tests because of delamination. A correlation between decrease in strength on aging of plywood bonded with alkali-catalyzed phenolic acid and increase in alkalinity of the panel was observed. Because of the different absorption capacities of the phenolic resins for acids and alkalies, it is not possible to predict the pH of plywood panel from the pH of the resin film.

The susceptibility of birch wood, itself, to attack by acids and alkalies was determined in order to better understand the mechanism of the deterioration of resin-bonded plywood. A marked decrease in strength occurred when the pH of the wood was lowered below 2.0. In the range between pH 2.0 and 2.5, strong acids, such as hydrochloric and sulfuric, had a more pronounced deteriorating effect than weak acids, such as hypophosphorous and nitranilic. A marked decrease in strength of the birch also occurred when the pH was raised to 8.8 by the absorption of an alkali, tetraethanolammonium hydroxide. 29 p. 15c.

RP1749. Purification of sodium chloride and potassium chloride for use in electrochemical work, and the determination of small amounts of bromide.
Gladys D. Pinching and Roger G. Bates

The effects of small amounts of dissolved impurities on the potentials of silver-silver-halide electrodes immersed in solutions of alkali halides were studied. Traces of bromide exert disturbing effects on the potential of the silver-silver-chloride electrode. A convenient method for determining small amounts of bromide in the presence of chlorides and a satisfactory means of purifying sodium and potassium chlorides for precise electrochemical work are outlined. The procedure involves treatment of a saturated solution of the salt with chlorine, two successive precipitations with hydrogen chloride, and fusion of the air-dried product. A method for diminishing hydrolysis of the salts during fusion is described. 8 p. 10c.

RP1750. Preparation of mannuronic lactone from algin.
Harriet L. Frush and Horace S. Isbell

A simple procedure is reported for the preparation of crystalline mannuronic lactone from algin. The algin is converted to alginic acid, which is hydrolyzed by the action of concentrated sulfuric acid followed by dilute acid. In contrast to prior methods, the lactone is crystallized directly from the hydrolyzate of alginic acid without the intermediate separation of the amorphous barium salt or the cinchonine salt. The yield is from 25 to 30 percent of the alginic acid used. The preparation and properties of crystalline sodium mannuronate and potassium mannuronate monohydrate are also described. 4 p. 10c.

RP1751. Experimental manufacture of paper for war maps.
Charles G. Weber and Merle B. Shaw

Early in World War II, a new map paper was developed that greatly improved the quality and performance of war maps. The National Bureau of Standards cooperated in the development and, subsequently, determined by experimental manufacture how to make the paper from commercially available raw materials. The best results were obtained in experimental manufacture by using fiber furnishes of 100-percent strong bleached sulfate pulps with the addition of melamine-formaldehyde resin to increase the wet strength and titanium dioxide to produce the desired opacity. It was essential that the beating be very carefully controlled to preserve the maximum fiber strength. The most critical requirements from a manufacturing standpoint were very high resistance to tear, high wet tensile strength, high opacity, and good smoothness. A moderate degree of wildness was not objectionable. The data obtained by experiments were applied to initiate the commercial production of the new paper to meet unprecedented tonnage requirements. 5 p. 10c.

RP1752. Purification, purity, and freezing points of 7 heptanes, 16 octanes, 6 pentenes, cyclopentene, and 7 C_9H_{12} alkylbenzenes of the API-Standard and API-NBS series.

Anton J. Streiff, Evelyn T. Murphy, Vincent A. Sedlak, Charles B. Willingham, and Frederick D. Rossini

This report describes the purification and determination of freezing points and purity of 37 hydrocarbons of the API-Standard and API-NBS series, including 7 heptanes, 16 octanes, 6 pentenes, cyclopentene, and 7 C_9H_{12} alkylbenzenes. 47 p. 20c.

RP1753. Carrier-distillation method for spectrographic analysis and its application to the analysis of uranium-base materials.

Bourdon F. Scribner and Harold R. Mullin

A method of fractional distillation in the direct-current arc was developed for the spectrographic determination of 33 volatile impurity elements at concentrations as low as a fraction of a part per million in uranium-base materials. The method involves (1) the conversion of the sample matrix to a form having low volatility, (2) the addition of a small amount of a selected volatile "carrier" material, and (3) partial distillation of the mixture in a direct-current arc with an electrode assembly of improved design. In the analysis of uranium-base materials, the sample was converted to the oxide U_3O_8 and gallium oxide was added as a carrier (2 parts Ga_2O_3 , 98 parts U_3O_8). The procedure was applied to the determination of Ag, Al, As, Au, B, Ba, Be, Bi, Cd, Co, Cr, Cs, Cu, Fe, Ge, Hg, In, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Rb, Sb, Si, Sn, Tl, V, and Zn. Repeated results for B, Cd, Si, Fe, Mg, and Mn, determined photometrically, agreed within ± 10 percent. The high sensitivity and general applicability of the method are results of the characteristic that the refractory sample matrix is not volatilized appreciably, during the period that the minute quantities of impurity vapors are swept into the arc by the carrier. 10 p. 10c.

RP1754. Vacuum-tube acceleration pickup.....Walter Ramberg

The vacuum-tube acceleration pickup consists of a fixed indirectly heated cathode and two plates on either side of the cathode which are mounted elastically to deflect in response to acceleration normal to the plane of the plates. The tube has a natural frequency of about 800 cycles per second, and it has a flat response for sinusoidal accelerations from 0 to 200 cycles per second with enough output at accelerations of the order of 10 g to drive a recording galvanometer directly without the complications of an amplifier. The use of the tube is recommended in those applications in which its peculiar advantages of high natural frequency, ability to withstand large accelerations, and linearity outweigh the disadvantages of zero drift, warming-up time, high current consumption, and the need of filtering to remove natural frequency response. 7 p. 15c.

RP1755. Comparative bond efficiency of deformed concrete reinforcing Bars.

Arthur P. Clark

The purpose of the tests was to determine the resistance to slip in concrete of 17 different designs of deformed reinforcing bars.

The tests were of the pull-out type in which the bars were cast in a horizontal position; the depth of concrete under the bars and the length of embedment were varied. The slip of the bar was measured at the loaded and free ends.

Three tests were made of each variable for each design of deformation.

It was established that a certain group of the bars was definitely superior to the others, in the sense that their average rating was significantly higher than the average of the others. Bars cast in the top position were much less effective than those cast in the bottom position. 8 p. 10c.

RP1756. Development of a hydrochloric acid process for the production of alumina from clay.

James I. Hoffman, Robert T. Leslie, Harold J. Caul, Lewis Jesse Clark, and John Drake Hoffman

The development of a process for the extraction of alumina from clay and the construction of a pilot plant are described.

The process consists in (1) roasting clay at about $700^\circ C$, (2) digesting the roasted product with dilute hydrochloric acid, (3) filtering to separate the insoluble siliceous matter from the solution containing the aluminum and soluble impurities, such as iron and alkali salts, (4) concentrating the solution, (5) precipitating the aluminum as the hydrated chloride from the concentrated solution by adding hydrochloric acid gas, (6) removing the crystals of hydrated aluminum chloride, (7) washing the crystals to remove adhering impurities, (8) calcining the hydrated chloride to obtain alumina, and (9) recovering hydrochloric acid from the waste products at the end of the process.

The operation of the pilot plant shows that the process is feasible for the production of alumina from clay but that the alumina costs more than that produced from bauxite by the present well-known processes. 19 p. 15c.

RP1757. Study of Ofner's method for the determination of invert sugar.

Emma J. McDonald and Anne L. Turcotte

In a previous investigation Jackson and McDonald studied Ofner's method for the determination of invert sugar in sucrose. They modified the procedure and were thus able to increase the reproducibility of results when determining from 5 to 25 mg of invert sugar in the presence of sucrose. This method has now been applied to pure invert sugar and to sugar samples containing 5 mg or less of invert sugar in 10 g of sucrose. It has proved to be a suitable method for the analysis of high-grade refined sugars as well as for the determination of 25 mg or less of invert sugar alone. A table is given for the conversion of milliliters of iodine consumed to milligrams of invert sugar present. 5 p. 10c.

Title page and contents for volume 37. 5 p. 5c.

RESEARCH PAPERS FROM JOURNAL OF RESEARCH OF THE NATIONAL BUREAU OF STANDARDS, VOLUME 38, JANUARY—JUNE 1947

RP1758. Vibrational frequencies of semirigid molecules: a general method and values for ethylbenzene.....William J. Taylor and Kenneth S. Pitzer

It is shown that in normal coordinate calculations of the vibrations of molecules it is sometimes advantageous to calculate the kinetic-energy matrix, rather than the reciprocal kinetic-energy matrix. Explicit formulas are given for the elements of the kinetic-energy matrix. Illustrative calculations are given for propane, toluene, and ethylbenzene. A semiempirical assignment of the vibration frequencies of ethylbenzene is made on the basis of these calculations and the spectroscopic data. 17 p. 15c.

RP1759. Analysis of a standard sample of natural gas by laboratories cooperating with the American Society for Testing Materials....Martin Shepherd

This is a report of the analysis of a standard sample of natural gas by 30 laboratories cooperating with Subcommittee VII of Committee D-3 of the American Society for Testing Materials. The data are presented in a series of frequency distribution plots that show at a glance how the analyses from all laboratories compare with respect to each component determined, as well as calculated heating value and specific gravity. The heating value and specific gravity determined by analysis are compared with values carefully measured at the National Bureau of Standards. The analyses were performed volumetrically by the absorption and combustion methods, and the plots form a clear picture of this type of gas analysis in this country. Although some very creditable work is reported, the need for standardization is evident. 33 p. 20c.

RP1760. Purification, purity, and freezing points of 8 nonanes, 11 alkylcyclopentanes, 6 alkylcyclohexanes, and 4 butylbenzenes of the API-Standard and API-NBS series.

Anton J. Streiff, Evelyn T. Murphy, Janice C. Cahill, Helen F. Flanagan, Vincent A. Sedlak, Charles B. Willingham, and Frederick D. Rossini

This report describes the purification and determination of freezing points and purity of 29 hydrocarbons of the API-Standard and API-NBS series, including 8 nonanes, 11 alkylcyclopentanes, 6 alkylcyclohexanes, and 4 butylbenzenes. 42 p. 20c.

RP1761. Infrared absorption spectra of some experimental glasses containing rare earth and other oxides.....Ralph Stair and Conrad A. Faick

This paper gives spectral transmission data on soda lime glass containing rare earth (Y, Pr, Nd, Sm, Gd, Er) or other coloring oxides (V, Cr, Mn, Co, Ni, U) in the spectral region of 0.7 to 4.5 microns. 7 p. 10c.

RP1762. Properties of water-repellent fabrics.

John W. Rowen and Domenick Gagliardi

A review and an analysis of the theory of water repellency of textile fabrics have been made. The physicochemical basis underlying the wettability, or water repellency, of treated fabrics is discussed. A survey of the laboratory test methods for evaluating water repellency of textile fabrics is presented. A study was made of the water-repellent properties of 11 commercial raincoat and 4 military fabrics. For this study two of the more recent test methods were examined, the drop-penetration and the contact-angle tests. Two other, and older, test methods were also studied, the spray-rating and the hydrostatic-pressure tests. Several exploratory observations were made in an attempt to determine the mechanism by which water-repellent fabrics lose their repellency when exposed to rain. 15 p. 10c.

RP1763. Adsorption of water vapor by untanned hide and various leathers at 100°F.
Joseph R. Kanagy

Adsorption of water vapor by untanned hide and various tannages of leather was determined at relative humidities ranging from 0 to 96 percent of 100°F. The Brunauer, Emmett, and Teller equations for adsorption of gases in multimolecular layers were applied to the data. Adsorption for all of the samples below a relative humidity of 75 percent is a function of the available surface. Above 75 percent relative humidity, other factors exert an influence, the most important of which is probably size of the capillaries. Untanned hide and chrome tanned leather adsorb the most water vapor except at relative humidities above 75 percent at which sole leather adsorbs more. The behavior of the sole leather in this region is ascribed to the presence of deliquescent materials used in the finishing process. The other vegetable-tanned leathers adsorb less moisture than either hide or chrome leather. Calculated heats of adsorption indicate that the affinity of groups for water is not appreciably altered by tanning and that the adsorption is physical in nature. Methods by which the data may be applied to practical processes, such as fatliquoring and tanning, are pointed out. 17 p. 10c.

RP1764. Concentration of the isotopes of mercury by free evaporation in a 10-cell counter-current reflux still.

A. Keith Brewer and Samuel L. Madorsky

Concentration of the isotopes of mercury was carried out in a counter-current molecular still consisting of 10 stages. Distillation temperatures varied from 55° to 100°C. A single-stage molecular still was operated, also with mercury, at temperatures varying from 108.1° to 128°C with those obtained previously by other investigators operating with single-stage stills. 7 p. 10c.

RP1765. Concentration of isotopes of potassium by the counter-current electromigration method.

A Keith Brewer, Samuel L. Madorsky, John Keenan Taylor, Vernon H. Dibeler, Paul Bradt, O. Lee Parham, Roy J. Britten, and J. Gilman Reid, Jr.

A new electromigration method for the separation of isotopes is described. This method is based on the principle of setting up a flow of electrolyte through a packed column in a direction counter-current to the flow of the isotopic ions being separated and at a rate intermediate between the velocities of these ions. Under these conditions, the faster moving ions will make headway against the electrolyte stream while the slower moving ions will be carried back. The separation coefficient $\epsilon - 1$ in the case, for example, of cations, is given as equal to $FV_c C \ln S / 1000 I^+ t$, where F is the Faraday constant, V_c is cathode volume in cubic centimeters, C is normality of the electrolyte, S is separation factor, I^+ is positive ion current and t is time in seconds. Free space and temperature distribution in the packing, balance between ion transport and stream counter-flow and other factors which determine column efficiency, are described. In a series of experiments for the concentration of ^{39}K in the cathode compartment of the electromigration cell, the abundance ratio $N = ^{39}\text{K}/^{41}\text{K}$ was increased from its normal value of 14.2 to a maximum of 24 in about 500 hours of operation and a maximum separation coefficient of 0.385×10^{-2} was obtained. Attempts to concentrate ^{41}K in the anode compartment resulted in a lowering of the isotope abundance ratio to a minimum of 9.1. A study of the distribution of ^{39}K in the packing in experiments carried out for the concentration of ^{39}K in the cathode compartment, showed that the abundance ratio decreases rapidly from the cathode to anode direction. A description is given of the mass-spectrometer used in measuring the abundance ratio $^{39}\text{K}/^{41}\text{K}$, also, of the automatic control used in regulating the counter-flow in some of the electromigration cells. 32 p. 15c.

RP1766. Concentration of ^{39}K by countercurrent electromigration: Some theoretical aspects of the operation.....James W. Westhaver

Equations are derived which describe the operation (A), for the early stages of the run, (B), after infinite time with no production, and (C), after infinite time at fixed production. The formulas under (A) enable evaluation of the elementary separation coefficient, ϵ . Those under (B) enable calculation of the maximum separation in terms of various channeling factors which determine the length of theoretical unit cell, h . The formulas under (C) enable calculation of optimum production conditions. When measured by the smallness of h , the analysis depicts the fractionator as one which is about 100 times more powerful than a modern laboratory distillation column. 15 p. 10c.

RP1767. Concentration of isotopes of chlorine by the countercurrent electromigration method.....Samuel L. Madorsky and Sidney Straus

The isotope ^{35}Cl was concentrated in the anode compartment of an electromigra-

tion cell, with NaCl as the electrolyte. The operation was regulated by means of a stationary boundary between solutions of NaOH and NaCl as the lower and upper liquids, respectively. A concentration of ^{36}Cl from the normal value of 75.76 percent to a minimum value of 80.7 percent was obtained in 474 hours. The maximum initial separation coefficient, $\epsilon - 1$, was 0.207×10^{-2} . 5 p. 10c.

RP1768. Normal coordinate analysis of the vibrational frequencies of ethylene, propylene, *cis*-2-butene, *trans*-2-butene, and isobutene.

John E. Kilpatrick and Kenneth S. Pitzer

The secular equations for the vibrations of ethylene, propylene, *cis*-2-butene, *trans*-2-butene, and isobutene have been derived and have been factored to the greatest possible extent. A potential expression has been fitted to an assignment of vibrational frequencies for ethylene and deuterioethylene. Some of the constants so determined have been used in deriving approximate potential expressions for propylene, *cis*-2-butene, *trans*-2-butene, and isobutene. With the vibrational frequencies calculated from these potential expressions as a guide, frequency assignments have been made for propylene, *cis*-2-butene, *trans*-2-butene, and isobutene. 19 p. 15c.

RP1769. Infrared absorption spectra of twelve cyclopentanes and cyclohexanes.

Earle K. Plyler, Ralph Stair, and Curtis J. Humphreys

The infrared absorption spectra of seven cyclopentanes and five cyclohexanes have been measured in the region from 2 to 15 microns. The substances were cyclopentane, methylcyclopentane, 1,1-dimethylcyclopentane, *trans*-1,2-dimethylcyclopentane, *trans*-1,3-dimethylcyclopentane, *cis*-1,2-dimethylcyclopentane, and *cis*, *trans*, *cis*-1,2,4-trimethylcyclopentane, also cyclohexane, methylcyclohexane, 1,1-dimethylcyclohexane, *trans*-1,2-dimethylcyclohexane, and *cis*-1,2-dimethylcyclohexane. The wavelengths of all the observed absorption bands are given in a table, and a graph is shown of the percentage transmission over the wave length region of each substance. The hydrocarbons were highly purified in the chemistry division and these spectra will be of value as a check on the purity of these compounds which may be obtained from other sources. Also the more intense bands serve as a means of identification. For each substance the bands that are best suited for distinguishing it are noted.

Of special interest are the four dimethylcyclopentanes which were studied. The structural positions of the substituted methyl groups differ only slightly, but the spectral difference is quite marked. The infrared absorption spectra are well suited to show characteristic differences between isomers.

The measurements were made with a Perkin-Elmer spectrometer with a General Motors amplifier and Brown recorder. A slit control mechanism is described in detail. Although the slit control gear arrangement is relatively simple, the results obtained with it are good. The energy output is held nearly constant from 3.5 to 14.5 microns. 18 p. 15c.

RP1770. Elastic behavior and creep of refractory bricks under tensile and compressive loads.....Lewis E. Mong

Nine brands of firebrick, including two high alumina, four fire clay, two siliceous, and one silica, were subjected to creep tests. Specimens were cut from 9-inch bricks. Creep tests, with either tensile or compressive stresses, were made at 11 temperatures from 25° to 950°C, inclusive. Durations of tests were approximately 240 days. Small length changes, independent of stress direction, occurred at the lower temperatures. Lowest temperatures at which creep was significant were: high alumina, 700° to 850°C; fire clay, 600° to 700°C; siliceous and silica, 950°C. Creep results with compressive stresses could not be correlated with results with tensile stresses. At 950°C, specimens of different brands showed greatly different capacities to carry load. Repeated heatings caused growth of silica brick. Moduli of elasticity at room temperature were determined before and after the various heat treatments, and resultant changes in moduli are recorded. The changes were large for silica brick and small for the fire-clay brick. 12 p. 10c.

RP1771. Surface tensions of some optical glasses. .Leo Shartsis and Alden W. Smock

The surface tension of a number of optical glasses made at the National Bureau of Standards was measured by a modification of the anchor-ring method. At 1,300°C, the values for the flint glasses were in the range 210 to 230 dynes/cm; those for the barium-crown glasses were 260 to 310; the other types of glasses had intermediate values. Most of the glasses had positive temperature coefficients of surface tension. The surface-tension values increased with increasing periods of time. The glasses were maintained at elevated temperatures immediately prior to measurement. Positive rank correlation coefficients of statistical significance were found between seed quality of optical glasses and such factors as surface tension, pot attack, and amount of gas liberated during the melting process. 10 p. 10c.

RP1772. Laminar boundary-layer oscillations and transition on a flat plate.

Galen B. Schubauer and Harold K. Skramstad

This is an account of an investigation conducted at the National Bureau of Standards, with the cooperation and financial assistance of the National Advisory Committee for Aeronautics, in which oscillations were discovered in the laminar boundary layer along a flat plate. These oscillations were found during the course of an experiment in which transition from laminar to turbulent flow was being studied on the plate as the turbulence in the wind stream was being reduced to unusually low values by means of damping screens. The first part of the paper deals with experimental methods and apparatus, measurements of turbulence and sound, and studies of transition. A description is then given of the manner in which oscillations were discovered and how they were found to be related to transition, and then how controlled oscillations were produced and studied in detail. The oscillations are shown to be the velocity variations accompanying a wave motion in the boundary layer, this wave motion having all of the characteristics predicted by a stability theory based on the exponential growth of small disturbances. A review of this theory is given. The work is thus experimental confirmation of a mathematical theory of stability which had been in the process of development for a period of approximately 40 years, mainly by German investigators. 42 p. 20c.

RP1773. Ceramic coatings for high-temperature protection of steel.

William N. Harrison, Dwight G. Moore, and Joseph C. Richmond

A new type of ceramic coating for the protection of low-carbon steel in high-temperature service was developed during the war at the National Bureau of Standards and was used by the Army and Navy on the exhaust systems of certain aircraft and other vehicles. The outstanding features of these coatings are (a) high resistance to chipping under repeated thermal shock, (b) protection of the metal against oxidation during prolonged exposure at temperatures up to about 1,250°F, (c) freedom from the cracking and blistering produced in conventional porcelain enamels under comparable conditions of high temperature and severe thermal gradients, and (d) a mat surface which does not show high lights and, therefore, decreases the visibility. 15 p. 10c.

RP1774. Electrical characteristics of quartz-crystal units and their measurement.

William D. George, Myron C. Selby, and Reuben Scolnik

The problem of measuring the dynamic electrical characteristics of high frequency quartz-crystal units was investigated by using ordinary laboratory instruments such as *r-f* bridges and *Q* meters. Measurement methods and technics are given, together with relative merits and limitations. Antiresonance impedance up to 5,000,000 ohms was measured to ± 5 percent or better. Data concerning constancy of electrical characteristics, secondary responses, and changes with amplitude of vibration and temperature are given for a large number of 8.7 Mc BT-cut crystal units having representative types of mountings. Results obtained on a few 50- and 100-kc units are also included. A convenient type of graphical representation of electrical characteristics of normal crystal units is suggested. 20 p. 15c.

RP1775. Ionization and dissociation of *cis*- and *trans*-2-butene by electron impact.

Vernon H. Dibeler

A study has been made of the appearance potentials and relative abundance of a number of ions from the mass spectra of *cis*- and *trans*-2-butene. The appearance potentials were found to be in generally good agreement with spectroscopic data. The mass spectra of the 2-butenes were compared with those of 1-butene and isobutene. The $C_2H_5^+$ ion was found to be the only ion showing a significant difference between the 2-butene isomers. This difference approached a maximum with ionizing electrons of 40-volt energy and remained constant up to energies of 100 volts. 8 p. 10c.

RP1776. Properties of barium-strontium titanate dielectrics.

Elmer N. Bunting, George R. Shelton, and Ansel S. Creamer

The results on barium-strontium titanates are given for heat treatments, absorption, shrinkage, thermal expansion, dielectric constant (*K*) at -60° to 85°C , and also for *Q*, the reciprocal of the power factor, at 25°C for frequencies of 50 to 20,000 kc/s. A few measurements of *K* and *Q* were made at 3,000 mc/s. Specimens matured (absorption less than 0.1 percent) at $1,250^\circ$ to $1,430^\circ\text{C}$. *K* values ranged from 34, for BaO:4TiO_2 , to several thousand for specimens with compositions on the BaTiO_3 - SrTiO_3 join. Specimens having the composition BaO:5TiO_2 were unique in that their temperature coefficient of *K* was practically zero. *Q* values ranged from 50 to 100 for test pieces containing over 40 percent of BaO, and from 400 to 10,000 for those with less than 40 percent of BaO. *K* values did not change appreciably with frequency.

Linear thermal expansions between 25° and 700°C ranged from 0.6 to 0.84 percent. Many of these specimens could be used in radio equipment. 13 p. 10c.

RP1777. Determination of small amounts of carbon monoxide in air by various reference methods.....Martin Shepherd

This is a report of the cooperative analyses of two samples of carbon monoxide in air. The analyses were made by laboratories engaged in investigations for the military services during the past war, and this work served to bring the results of these laboratories into common agreement. 8 p. 10c.

RP1778. A magnetic-lens electron spectrometer: Radiations from 5.3 year cobalt⁶⁰. Leonard C. Miller and Leon F. Curtiss

An improved magnetic-lens spectrometer, similar in principle to that described by Deutsch, Elliott, and Evans has been constructed. The structure, operation, and method of calibration, using a ThB + C deposit, is described. Results of measurements of the primary beta-ray spectrum and of the gamma-ray spectrum converted in a uranium radiator are given. These give an end point for the value reported by Deutsch, Elliott, and Roberts of 0.308 ± 00.008 million electron volt (Mev). Two gamma rays were measured at 1.16 and 1.32 Mev, likewise in agreement with the values of 1.100 ± 0.03 and 1.30 ± 0.03 Mev, given by the same authors. 6 p. 10c.

RP1779. Preparation and physical properties of several aliphatic hydrocarbons and intermediates.

Frank L. Howard, Thomas W. Mears, A. Fookson, Philip Pomerantz, and Donald B. Brooks

In the course of a continuing investigation of the knock ratings of aliphatic hydrocarbons, pure paraffins and olefins have been prepared in quantities sufficient for engine tests. This report describes the methods of preparation and purification of three pentanes, four hexanes, three heptanes, four octanes, eight nonanes, seven decanes, four hexenes, five octenes, six nonenes, six decenes, and a number of alcohols, ketones, esters, and alkyl halides. Most of these compounds were highly purified. Physical constants measured include freezing point, boiling point, and its variation with pressure, refractive index, and density, and their variations with temperature. 31 p. 15c.

RP1780. Synchronization of oscillators.....Robert D. Huntoon and Albert Weiss

A theory is presented which predicts the behavior of any self-limiting oscillator in the presence of an injected sinusoidal voltage or current of small but constant magnitude. The internal mechanism responsible for synchronization is not needed, and the theory is thus applicable to any source of alternating current. Experimental verification of the theory is presented for the case of a low-power Hartley oscillator operating at 11.5 megacycles.

The theory is extended to include the mutual synchronization of two oscillators of arbitrary properties, and a method of treating the mutual interaction of several oscillators is outlined.

The theory is applied to a number of examples to indicate briefly the properties of a synchronized oscillator when used as (1) a linear voltmeter for small voltages, (2) a field-intensity meter, (3) a linear amplitude modulation demodulator for small signals, (4) a frequency modulation demodulator, (5) a synchronous amplifier limiter. The use of a synchronized oscillator for these applications is of particular interest because microwave generators can be used in addition to the more conventional triode oscillators. 14 p. 10c.

RP1781. Disintegration of scandium⁴⁶.....Irving Feister and Leon F. Curtiss

The beta and gamma radiations of scandium⁴⁶ have been studied by means of a magnetic-lens spectrometer. The beta-ray spectrum was found to be simple, with the maximum energy at 0.36 Mev. No indications were found of any other group of beta rays having energies above this value. The gamma-ray spectrum consists of two gamma rays, with energies 0.88 Mev and 1.12 Mev. These two gamma lines appear to be of equal intensity, and are therefore very probably in cascade. 4 p. 10c.

RP1782. High-temperature X-ray diffraction apparatus.

Alvin Van Valkenburg and Howard F. McMurdie

A furnace for obtaining X-ray powder diffraction patterns of samples at elevated temperatures has been designed and constructed. This furnace is used with the Norelco X-ray spectrometer, in which the photographic film is replaced by a Geiger counter. The assembly has the following advantages over previously described high-temperature X-ray powder diffraction cameras: (1) Any number of patterns can be obtained without intermediate cooling of the sample, (2) in 40 minutes the pattern

is produced in a form ready for study, and (3) patterns can be obtained at temperatures up to 1,500°C. The diffraction data for the form of $2\text{CaO} \cdot \text{SiO}_2$ are given. 4 p. 10c.

RP1783. Heats of combustion and isomerization of six nonanes.

Walter H. Johnson, Edward J. Prosen, and Frederick D. Rossini

The heats of isomerization of six of the nonanes were determined by measurement of the ratios of the heats of combustion in the liquid state of purified samples of these compounds by the procedure previously described for other hydrocarbons. The data yield the following values for the heat of isomerization in the liquid state at 25°C, ΔH° , of *n*-nonane into the other nonanes, in kilocalories per mole: *n*-nonane, 0.00; 3,3-diethylpentane, -0.01 ± 0.33 ; 2,2,3,3-tetramethylpentane, -0.70 ± 0.31 ; 2,2,3,4-tetramethylpentane, 0.56 ± 0.22 ; 2,2,4,4-tetramethylpentane, -1.11 ± 0.25 ; 2,3,3,4-tetramethylpentane, -0.62 ± 0.35 . These data were combined with the value previously reported for the heat of combustion of *n*-nonane to obtain values for the heats of combustion of the other five nonanes in the liquid state at 25°C. 4 p. 10c.

RP1784. Structure of difructose anhydride II.

Emma J. McDonald and Anne L. Turcotte

The structure of difructose anhydride II is shown to be 2,1'-4,2'-difructofuranose. 3,4,6-Trimethylfructose has been identified as one of the hydrolysis products of hexamethyl difructose anhydride II. This has been accomplished by a chromatographic separation with subsequent identification of 3,4,6-trimethylglucosazone. 3 p. 10c.

RP1785. Mangabeira latex and rubber. Norman Bekkedahl and Waldemar Saffiot

The tree *Hancornia speciosa*, more commonly known as the mangabeira, which grows in several of the tropical states of Brazil, yields a rubber-containing latex. This tree is very well known for the delicious fruit (mangaba) it bears, but it does not have such a good reputation for the quality of rubber it produces. The natives of Brazil coagulate this rubber by means of solutions of alum or sodium chloride. It has been found, however, from this investigation that if these coagulating agents are replaced by dilute hydrochloric acid or by the latex from another tree, the caxinguba (*Ficus anthelmintica*), a rubber of much improved properties can be produced. 12 p. 10c.

RP1786. Spectrographic determination of minor elements in portland cement.

Armin W. Helz and Bourdon F. Scribner

A rapid spectrographic procedure for the determination of the minor metallic elements in portland cement is described. The method shows promise of easy extension to cement raw materials and many ceramic materials, provided reliable standard samples of these materials are available.

In the application of the method to portland cement, seven minor elements were determined. The precision in terms of probable error of a single determination is within 3 percent of the oxide concentration for aluminum, iron, magnesium, manganese, and titanium; 5 percent of the Na_2O concentration; and 8 percent of the K_2O concentration. Other minor elements, such as lithium, strontium, chromium, zirconium, and vanadium, may readily be included.

The spectrographic analyses of 21 portland cements are compared with chemical results for an estimate of the accuracy. Salient features of the procedure are (1) employing pellets consisting of the cement powder, with graphite as a binder, cobalt oxide as an internal standard, and potassium nitrate as a buffer, (2) applying the pellet as an electrode for excitation by an overdamped condenser discharge, and (3) photographing the spectrum with a step sector and a diffusing screen for obtaining uniformity of illumination. 9 p. 10c.

RP1787. Electrical methods for diamond-die production.

Chauncey G. Peters, Walter B. Emerson, Karl E. Nefflen, Forest K. Harris, and Irvin L. Cooter

Electrical methods to drill diamond have been developed and applied to the making of diamond wire-drawing dies 0.0005 to 0.0015 of an inch in diameter that heretofore were produced solely by mechanical operations. The time required to produce excellent dies is reduced materially by applying these electrical methods to the following operations: 1, Pilot drilling the primary cone with a high-voltage spark in air; 2, drilling the secondary cone with a low-voltage spark in an electrolyte.

These two methods of drilling are described and their application to the making of small dies at the National Bureau of Standards is given in detail. 16 p. 10c.

RP1788. Effect of artificial aging on tensile properties and resistance to corrosion of 24S-T aluminum alloy.

Hugh L. Logan, Harold Hessing, and Harold E. Francis

The effect of aging commercial 24S-T aluminum alloy sheet, for various periods at 350°, 375°, 385° and 400°F, on its tensile properties and resistance to corrosion was determined. Aging for 3 hours at 385°F produced an increase in yield strength of about 25 percent above an initial value of about 50,000 lb/in.², an increase in tensile strength of about 3 percent above an initial value of 70,000 lb/in.², and a decrease to about one-third of the initial elongation of 17 to 18 percent. Approximately the same values for these properties were obtained by aging the material for 20 hours at 350°F, 5 hours at 375°F, or 1½ hours at 400°F. Materials aged 3 to 10 hours at 385°F and 6 to 12 hours at 375°F were generally immune to stress corrosion cracking and were no more severely damaged in corrosive media, NaCl + H₂O₂ solution or marine atmosphere, than the commercially heat-treated material exposed without artificial aging. 25 p. 15c.

RP1789. Cooperative analysis of a standard sample of natural gas with the mass spectrometer.....Martin Shepherd

The mass spectrometer was used for the analysis of a standard sample of natural gas by laboratories cooperating with Subcommittee VII of Committee D-3 of the American Society for Testing Materials. The results of the cooperative analysis show the reproducibility and, in certain respects, the accuracy of this powerful new apparatus for gas analysis. The heating value and the specific gravity of the sample calculated from the analytical data were compared with the known values. 7 p. 10c.

RP1790. Infrared emission spectra of krypton and argon.

Curtis J. Humphreys and Earle K. Plyler

The analysis of the spectra of the noble atmospheric gases, utilizing descriptive data covering the photographically accessible region, has long indicated the possibility of a considerable extension of most of these spectra into the infrared region beyond 1.3 microns. Observations of the spectra of krypton and argon, in the region between 1 and 2 microns, have been made with a Perkin-Elmer spectrometer, fitted with a flint-glass prism cut to an angle of 55 degrees. The sources were Geissler tubes, used in previously reported work.

More than 15 new lines of krypton have been observed. Part of these are blends of unresolved pairs or groups. The emission maxima have been determined in favorable cases to a precision of two wave numbers, roughly equivalent to one-tenth of the smallest scale division on the wavelength drum. All observed lines have been classified, the most intense being represented by combinations of the type $2p-3d$, according to Paschen's notation. Two new levels from the configuration s^2p^3f have been found. The remaining unobserved combinations of the type $1s-2p$, occurring in this region, are, with one exception, too weak to be observed. The argon infrared spectrum was observed by Paschen. More of its predicted combinations are in the photographic region than in the case of krypton. A few lines near 1.4 microns have been observed. 5 p. 10c.

RP1791. Dipole moments and resonance of some benzein indicators and related compounds.....Arthur A. Maryott and S. F. Acree

An apparatus for the measurement of dielectric constants of liquids by the heterodyne method and, in particular, for the determination of dipole moments is described. Dipole moments ($\times 10^{18}$ electrostatic unit (esu)) are reported for, 4-hydroxybenzophenone (3.96), 4,4'-dihydroxybenzophenone (4.49), 4-hydroxy-2-methyl-5-isopropylbenzophenone (3.59), fuchson (5.83), benzaurin (6.85), aurin (7.96), *o*-cresolbenzein (6.68), thymolbenzein (6.67) and α -naphtholbenzein (6.07) using dioxane as solvent. The last six compounds contain the quinoidal structure and have unusually large moments. The values are nearly double those found for the derivatives of benzophenone that have corresponding polar groups. The influence of resonance involving highly dipolar excited structures in determining the actual state of these molecules is discussed. 8 p. 10c.

RP1792. An improved Geiger-counter arrangement for determination of radium content.....Francis J. Davis

Geiger-counter apparatus in which several counters may be placed in any position relative to each other is described. A circular arrangement of counters to give a counting rate approximately independent of the position of a source near the center of the circle is discussed. The relation of the position of the source to the counting rate of a single Geiger counter is discussed. A method of calculation of the self-absorption of a sample for the Geiger-counter arrangement used is given. 6 p. 10c.

RP1793. Changes caused in the refractivity and density of glass by annealing.

Arthur Q. Tool, Leroy W. Tilton, and James B. Saunders

The changes in the refractivity of several glasses caused by annealing at different temperatures are presented. The results are given in the form of equilibrium temperature coefficients, as the glasses were annealed at each annealing temperature until there was no further change in the refractivity or density. The measurements on refractivity and density were made at standard atmospheric temperatures since the changes in these properties at such temperatures have a greater practical significance than the corresponding changes at temperatures within the annealing range. 7 p. 10c.

RP1794. Conductimetric titrations of acids and bases in benzene and dioxane.

Arthur A. Maryott

Acid-base titrations were made conductimetrically in pure benzene and dioxane with picric, trichloroacetic, and camphorsulfonic acids, together with primary, secondary, and tertiary amines. Although the conductances of the solutions were extremely low, lower by a factor of 10^{-8} or more than in water, the titrations gave sharp end points which generally were accurate to 1 percent or better. The unusual, though similar behavior of all titrations involving trichloroacetic or camphorsulfonic acid, where the conductance of the salt was enhanced greatly by the presence of free acid, was interpreted in terms of a reaction between salt and acid leading to the formation of a complex anion. The occasional variations in conductance with time, in one instance suggesting slow attainment of some secondary ionic equilibrium, and the effect upon the titration curves of the addition of a small amount of methyl alcohol to the solvent are discussed. 10 p. 10c.

RP1795. Analyses of alkylates and hydrocodimers.

Augustus R. Glasgow, Jr., Anton J. Streiff, Charles B. Willingham, and Frederick D. Rossini

This paper presents the results of work by the American Petroleum Institute Research Project 6 on the analyses, with respect to individual hydrocarbon components, of 28 different alkylates and hydrocodimers. The samples reported include 15 sulfuric-acid alkylates (one C_3 , six C_4 , one C_4-C_5 , four C_5 , one hot-acid dimer, one hot-acid trimer, and one cold-acid trimer), five hydrofluoric-acid alkylates (one C_3 , one C_3-C_4 , one C_4 , one C_4-C_5 , and one C_5), and 8 hydrocodimers. The analyses were made utilizing analytical distillations performed at high efficiency with high reflux ratio, together with accurately measured values of boiling point (obtained during the distillation) and of refractive index of the fractions of distillate.

Also included in this report is a summary of the results of the subsequent spectrographic analyses, with respect to individual components, of one of the C_4 alkylates by six different laboratories, involving one Raman, one mass, and four infrared spectrometers. 45 p. 25c.

RP1796. An improved ice calorimeter — the determination of its calibration factor and the density of ice at $0^\circ C$. Defoe C. Ginnings and Robert J. Corruccini

There has been described an improved Bunsen ice calorimeter which has been constructed for measurements of enthalpy at high temperatures by the "drop" method. The calibration factor of the ice calorimeter has been determined electrically to be 270.37 ± 0.06 int. joules per gram of mercury, equivalent to 64.631 ± 0.014 calories per gram of mercury, where 1 calorie = 4.1833 int. joule. Using this calibration factor, it is calculated that the density of ice at $0^\circ C$ and 1 atmosphere pressure is 0.91671 ± 0.00005 g/ml. 10 p. 10c.

RP1797. Enthalpy, specific heat, and entropy of aluminum oxide from 0° to $900^\circ C$. Defoe C. Ginnings and Robert J. Corruccini

Apparatus consisting of a furnace and ice calorimeter has been used for the measurement of enthalpies at high temperatures by the "drop" method. The enthalpy (referred to $0^\circ C$) of a sample of aluminum oxide (corundum) has been determined in the range 0° to $900^\circ C$. Derived values of specific heat and entropy are given. 8 p. 10c.

RP1798. Transmission measurements with the Beckman quartz spectrophotometer. Kasson S. Gibson and Margaret M. Balcom

The Beckman quartz photoelectric spectrophotometer, covering the wavelength range from about 200 to 1,200 millimicrons is proving of great utility in spectral transmission and absorption measurements. Essential features of the instrument are described, including a constant-temperature inclosure (for samples) designed and constructed at the Bureau. Various instrumental characteristics are noted and possible errors discussed, particularly those that may be present in the measurement of polarizing samples. Wavelength calibrations are shown for two instruments. A detailed over-

all check of the reliability of data obtained on the Beckman spectrophotometer by means of glass standards of spectral transmittance shows it to give results over the wavelength range from 390 to 750 μ fully as reliable as those obtained with our other spectrophotometers, if various precautions are taken. 16 p. 10c.

RP1799. Mass spectrometer study of rare gases.

Vernon H. Dibeler, Fred L. Mohler, and Robert M. Reese

Appearance potentials and isotope abundance ratios for the rare gases have been measured with a Consolidated mass spectrometer. Results are consistent with spectroscopic values of appearance potentials and published isotope ratios. Ion currents at unit pressure increase with atomic number but no simple relation is evident. 4 p. 5c.

RP1800. Hydrocarbons in the 102° to 108°C fraction of petroleum.

Augustus R. Glasgow, Jr., Charles B. Willingham, and Frederick D. Rossini

This report describes the analysis of the hydrocarbons in the 102° to 108°C aromatic-free fraction of petroleum, which is shown to be composed substantially entirely of the following three compounds (normally boiling at the temperature indicated): ethylcyclopentane at 103.5°C; 1,1,3-trimethylcyclopentane at 104.9°C; 2,2-dimethylhexane at 106.8°C. The amounts of these three compounds in the original Ponca, Oklahoma, crude petroleum are estimated to be 0.16, 0.30, and 0.01 percent, respectively by volume. 6 p. 10c.

RP1801. Heats of combustion and solution of liquid styrene and solid polystyrene, and the heat of polymerization of styrene.

Donald E. Roberts, William W. Walton, and Ralph S. Jessup

Bomb-calorimetric measurements have yielded for the heats of combustion ($-\Delta H_c^\circ$) at 25°C of liquid styrene and solid polystyrene to form gaseous carbon dioxide and liquid water, the values 4394.88 ± 0.67 int. kj/mole (1050.58 ± 0.14 kcal/mole) and 4325.09 ± 0.42 int. kj/ C_8H_8 -unit (1033.89 ± 0.10 kcal/ C_8H_8 -unit), respectively, and for the heat of polymerization of liquid styrene to solid polystyrene at 25°C, the value 69.79 ± 0.66 int kj/mole (16.68 ± 0.16 kcal/mole). The results obtained on two samples of polystyrene of different molecular weight were in agreement within the precision of the measurements.

Measurements of the heat of solution of solid polystyrene in liquid monomeric styrene gave the value 3.59 ± 0.21 int. kj (0.86 ± 0.05 kcal) evolved per C_8H_8 -unit of polystyrene at 25°C. Addition of this to the value for the heat of polymerization of liquid styrene to solid polystyrene gives the value 73.38 ± 0.69 int. kj (17.54 ± 0.16 kcal) per mole of styrene for the heat of polymerization of liquid styrene at 25°C, when the final product is a solution of polystyrene in styrene containing 6.9 percent by weight of polystyrene. 10 p. 10c

RP1802. Torsion of a rubber cylinder.....R. S. Rivlin

It has been predicted theoretically that, in general, a right-circular cylinder of incompressible, highly elastic material, which is isotropic in its undeformed state, cannot be held in a state of pure torsional deformation by means of a torsional couple alone. In addition, normal surface tractions must be exerted over the plane ends of the cylinder. These normal surface tractions depend on the amount of torsion and on position on the plane ends of the cylinder. Experiments are reported here in which this phenomenon is observed in a right-circular cylinder of pure gum compound and the dependence of the surface traction on amount of torsion and its distribution over the surface of the cylinder is studied. 16 p. 10c.

RP1803. Compensation of the aperture ratio markings of a photographic lens for absorption, reflection, and vignetting losses.....Irvine C. Gardner

At present the diaphragm markings of a photographic lens are based entirely upon geometrical considerations and do not take into account the losses of light resulting from absorption, reflection, and scattering. A method of equivalent marking is described, in which, for example, the marking 8 does not correspond to the geometrically determined aperture ratio 1:8 but to an opening sufficiently larger to permit the transmission of as much light as would be transmitted by the aperture 1:8 in the absence of any losses due to absorption, etc. Such a system of apertures may be referred to as equivalent, or compensated, apertures. Two systems of compensation are given, one based upon the illumination at the center of the field and the other based upon the average illumination over the entire field, thus taking vignetting into account. A relatively simple photometric procedure for determining either of the two systems of compensated graduations is described. For use during a transition period, a system of markings is described that will permit exposures to be determined either with light losses compensated or by the present method without compensation. Except for the

change of markings on a lens, no other instrumental changes are required to apply the new system of exposure determination. 8 p. 10c.

RP1804. Heat capacities of gaseous oxygen, isobutane, and 1-butene from -30° to $+90^{\circ}\text{C}$Paul F. Wacker, Ruth K. Cheney, and Russell B. Scott

An adiabatic constant-flow calorimeter previously used was modified to improve its accuracy. The heat capacity of gaseous oxygen was measured at -30° , $+40^{\circ}$, and $+90^{\circ}\text{C}$, and the results were compared with values calculated from spectroscopic data. The experimental and spectroscopic values agreed within 0.04, 0.02, and 0.11 percent at the three temperatures. The heat capacity of isobutane was measured at -30° , $+0^{\circ}$, $+40^{\circ}$, and $+80^{\circ}\text{C}$. A few measurements were made on 1-butene at 40° and 90°C . Measurements on the hydrocarbons at two or more pressures permitted the calculation of values of $(\alpha^2 V / \alpha T^2)_P$. 10 p. 10c.

RP1805. Heats of solution of solid solutions of hexacalcium dialumino ferrite and dicalcium ferrite.....Edwin S. Newman

The heats of solution of members of the series of solid solutions between $6\text{CaO} \cdot 2\text{Al}_2\text{O}_3 \cdot \text{Fe}_2\text{O}_3$ and $2\text{CaO} \cdot \text{Fe}_2\text{O}_3$ have been determined. Members of this solid-solution series are formed in cement clinker instead of the single compound $4\text{CaO} \cdot \text{Fe}_2\text{O}_3 \cdot \text{Al}_2\text{O}_3$ as formerly assumed. It has been shown that this assumption causes a negligible error in the latent heats at present used in estimating the glass content of portland cement clinker. It is pointed out, however, that the compositions and heats of solution of the glasses actually formed in portland cement clinker are still unknown. These quantities must be determined before the accurate estimation of the phase composition and glass content of commercial portland cement clinker is possible. 4 p. 5c.

RP1806. Relative thickness of lead, concrete, and steel required for protection against narrow beams of X-rays.

George Singer, Harold O. Wyckoff, and Frank H. Day

The lead equivalents of X-ray protective barriers are given for both concrete and steel for potentials between 200 and 1,400 kv. These were determined experimentally using a pressure ionization chamber and an X-ray tube to which constant potential was applied. Narrow X-ray beams were used. The data obtained are compared with those published by other workers. Data on the relative masses referred to lead of both concrete and steel barriers are included. The agreement among the several laboratories is satisfactory when consideration is given to differences in the test specimens used and in the experimental technique. 7 p. 10c.

Title page and contents for volume 38. 5c.

CIRCULARS

Circulars are compilations of information on various subjects related to the Bureau's scientific, technical, and engineering activities. They include not only the results of Bureau studies, but give data of general interest from other sources.

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- C24. Publications of the Bureau of Standards, 1901 — 1925. 7th ed. 1925. 35c. Supplement. July 1, 1925, to Dec. 31, 1931. 35c. Supplement. Jan. 1, 1932, to Dec. 31, 1941. With subject and authors' indexes, 1901 to 1941. 50c.
- C25. Standard samples — general information. 9th ed. 1927. (Superseded by C398).
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- C57. United States standard tables for petroleum oils. 2d ed. 1916. (Superseded by C154).
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- C59. United States standard Baumé hydrometer scales. 1916.
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- C88. United States Government specification for leaded zinc oxide, dry and paste. 2d ed. 1922.
- C89. United States Government specification for white paint and tinted paints made on a white base, semipaste and ready mixed. 3d ed. 1927.
- C90. United States Government specification for red lead, dry and paste. 2d ed. 1922.
- C91. United States Government specification for ocher, dry and paste. 2d ed. 1922.

- C92. Operation and care of vehicle-type batteries. 1920.
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- C96. Recommended specifications for quicklime and hydrated lime for use in the cooking of rags for the manufacture of paper. 1920.
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- C99. The carbonization of lubricating oils. 1920.
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- C101. Physical properties of materials: I. Strength and related properties of metals and certain other engineering materials. 2d ed. 1924. Supplement 1937 (Superseded by C447).
- C102. United States Government specification for composite thinner for thinning semipaste paints when the use of straight linseed oil is not justified. 2d ed. 1922.
- C103. United States Government specification for spar varnish. 4th ed. 1926.
- C104. United States Government specification for asphalt varnish. 2d ed. 1923.
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- C106. Lime — definitions and specifications. 1920.
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- C111. United States Government specification for flat interior lithopone paint, white and light tints. 3d ed. 1928.
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- C131. United States Government specification for scouring compounds (a) and (b) for floors, and soap scouring compounds (c). 1922. (Superseded by C370).
- C132. United States Government specification for hand grit soap. 2d ed. 1924.
- C133. Description and operation of an electron-tube detector unit for simple radio receiving outfits. 1922.
- C134. United States Government specification for fire-extinguishing liquid (carbon tetrachloride base). 2d ed. 1924.
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- C137. Auxiliary condensers and loading coil used with simple homemade radio receiving outfits. 1923.

- C138. A decimal classification of radio subjects — an extension of the Dewey system. (Superseded by C385).
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- C145. Summary of technical methods for the utilization of molasses, collated from patent literature, for the use of the American sugar industry. 1924.
- C146. United States Government specification for water resisting red enamel. 1923.
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- C152. Recommended specification for ceramic whitening. 1923. 5c.
- C153. Recommended specification for quicklime and hydrated lime for the manufacture of silica brick. 1923.
- C154. National standard petroleum oil tables. 1924. (Supersedes C57. Superseded by C410).
- C155. United States Government master specification for coal-tar pitch for waterproofing and damp proofing. 1924.
- C156. United States Government master specification for coal-tar saturated rag felt for roofing and waterproofing. 1924.
- C157. United States Government master specification for coal-tar pitch for roofing. 1924.
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- C162. United States Government master specification for asphalt primer for roofing and waterproofing. 1924.
- C163. United States Government specification for titanium pigment, dry and paste. 1924.
- C164. United States Government master specification for flat glass for glazing purposes. 1924.
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- C166. United States Government master specification for light-weight duck (army duck), grey. 1924.
- C167. United States Government master specification for tent duck (special construction for bleaching or dyeing), grey. 1924.
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- C170. United States Government master specification for the construction of built-up roofing, type 4AWS. 1924.
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- C173. United States Government master specification for the construction of built-up roofing, type 4ACS. 1924.
- C174. United States Government master specification for the construction of built-up roofing, type 5ACS. 1924.
- C175. United States Government master specification for the construction of built-up roofing, type 3TCS. 1924.

- C176. United States Government master specification for the construction of built-up roofing, type 4TCS. 1924.
- C177. United States Government master specification for the construction of built-up roofing, type 5TCS. 1924.
- C178. United States Government master specification for the construction of built-up roofing, type 4TWS. 1924.
- C179. United States Government master specification for the construction of built-up roofing, type 5TWS. 1924.
- C180. United States Government master specification for the installation of metal flashings with built-up bituminous roofing. 1924.
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- C186. United States Government master specification for typewriter ribbons. 2d ed. 1927.
- C187. United States Government master specification for hectograph ribbons. 2d ed. 1927.
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- C189. Recommended specification for quicklime and hydrated lime for use in the absorption of carbon dioxide. 1924.
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- C192. United States Government master specification for asphalt prepared roofing. 1924.
- C193. United States Government master specification for liquid soap (for laundry use). 1925.
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- C195. United States Government master specification for powdered soap (for laundry use). 1925.
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- C207. Recommended specification for limestone, quicklime, lime powder, and hydrated lime for use in the manufacture of sugar. 1925.
- C208. United States Government master specification for wire rope. 1925.
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- C272. United States Government master specification for brown cotton sheeting. 1925.
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- C282. Fire-clay brick: Their manufacture, properties, uses and specifications. 1926.
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- C284. United States Government master specification for rubber bands. 1925.
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- C286. United States Government master specification for asphalt-saturated rag felt for flashings. 1925.
- C287. United States Government master specification for asphalt-saturated woven cotton fabric for waterproofing. 1925.
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- C292. United States Government master specification for water-suction hose (smooth bore). 1925.
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- C294. Standards for paper towels. 1925. (Superseded by C407).
- C295. Temperature corrections to readings of Baumé hydrometers, Bureau of Standards Baumé scale for sugar solutions (standard at 20°C.). 1926. 5c.
- C296. Research associates at the National Bureau of Standards. 1925.
- C297. United States Government master specification for plastic fire-clay refractories. 2d ed. 1926.
- C298. United States Government master specification for fire clay. 2d ed. 1926.
- C299. United States Government master specification for fire-clay brick. 2d ed. 1926.
- C300. Architectural acoustics. (Superseded by C380).
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- C312. United States Government master specification for rubber matting for use around electrical apparatus or circuits not exceeding 3,000 volts to ground 1926.
- C313. United States Government master specification for huck towels (with woven name). 1926.
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- C317. United States Government master specification for sodium carbonate, granular (monohydrate crystals). 1926.
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- C319. Index of United States Government master specifications promulgated by the Federal Specifications Board. Alphabetical list and numerical list. 3d ed. 1928. (Supersedes M73. Superseded by C371).
- C320. Puncture-sealing compounds for pneumatic tires. 1927.
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- C322. United States Government master specification for integral waterproofing material, water-repellent type (for use with portland cement mortar or concrete). 1927. (Superseded by C360).
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- C341. Use and care of automobile tires. 1927.
- C342. United States Government master specification for hollow load-bearing clay wall tile. 1927.
- C343. United States Government master specification for clay hollow fire-proofing, partition and furring tile. 1927.
- C344. United States Government master specification for clay hollow floor tile. 1927.
- C345. United States Government master specification for common clay brick. 1927.

- C346. Light metals and alloys — aluminum, magnesium. 1927. (Supersedes C76).
- C347. United States Government master specification for common sand-lime brick. 1927.
- C348. United States Government master specification for short, light, rubber boots. 1927.
- C349. United States Government master specification for boots, rubber, hip. 1927.
- C350. United States Government master specification for short, heavy, rubber boots. 1927.
- C351. United States Government master specification for cotton tablecloths. 1927.
- C352. United States Government master specification for jute burlap. 1927.
- C353. United States Government master specification for Axminster carpets and rugs. 1927.
- C354. United States Government master specification for plain velvet carpets. 1927.
- C355. United States Government master specification for wool bunting. 1927.
- C356. United States Government master specification for Wilton carpets and rugs. 1927.
- C357. United States Government master specification for white table oilcloth. 1927.
- C358. United States Government master specification for unlined linen fire hose. 1927.
- C359. United States Government master specification for netting, mosquito (unbleached bobbinet). 1928.
- C360. United States Government master specification for integral waterproofing material (for use with portland cement mortar or concrete). 1928. (Supersedes C322).
- C361. United States Government master specification for oil, linseed, raw. 1928. (Supersedes C82).
- C362. United States Government master specification for oil, linseed, boiled. 1928. (Supersedes C330).
- C363. United States Government master specification for packing flax. 1928. (Supersedes C239).
- C364. United States Government master specification for shade cloth. 1928.
- C365. United States Government master specification for cheesecloth, bleached. 1928. (Supersedes C257).
- C366. United States Government master specification for percale. 1928.
- C367. United States Government master specification for drill (unbleached). 1928.
- C368. United States Government master specification for shades, window; rollers; slats, cords, and accessories. 1928.
- C369. United States Government master specification No. 558 for trisodium phosphate, technical (phosphate cleaner). 1928.
- C370. United States Government master specification No. 34a for powder, scouring, for floors. 1928. (Supersedes C131).
- C371. Alphabetical index and numerical list of United States Government master specifications, promulgated by the Federal specifications board (complete to June 30, 1928). 1928. (Supersedes C319. Superseded by C378).
- C372. Recommended specification for quicklime and hydrated lime for use in soap making. 1929.
- C373. Recommended specifications for quicklime for use in the distillation of ammonia from ammonia liquors obtained in coke and gas manufacture. 1928.
- C374. X-ray and radium protection. Recommendations of international congress of radiology. 1929.
- C375. Weights per United States gallon and weights per cubic foot of sugar solutions. 1929. (Superseded by C457).
- C376. Thermal insulation of buildings. 1929. 5c.
- C377. Some properties of sponge rubber. 1929.
- C378. Alphabetical index and numerical list of Federal specifications promulgated by the Federal Specifications Board (complete to November 1, 1929). 1929. (Supersedes C371).
- C379. Care and adjustment of folding testers of the Schopper type. 1929. 5c.
- C380. Architectural acoustics. 1930. (Supersedes C300. Superseded by C396).
- C381. Sodium oxalate as a standard in volumetric analysis. 1930. (Supersedes C40). 5c.
- C382. Bismuth. 1930. 10c.
- C383. Washing, cleaning, and polishing materials. 1930. (Supersedes C62. Superseded by C424).
- C384. Sound absorption coefficients of the more common materials. 1930.
- C385. Classification of radio subjects: An extension of the Dewey decimal system. 1930. (Supersedes C138).
- C386. Specifications for the manufacture and installation of railway track scales for light industrial service (for knife-edge scales only). 1930.

- C387. Copper electrotyping. 1930. (Supersedes C52). 10c.
- C388. Use of bismuth in fusible alloys. 1930. 5c.
- C389. The making of mirrors by the deposition of silver on glass. 1931. 10c.
- C390. American standard specifications for dry cells and batteries. 1930. (Supersedes C139. Superseded by C414).
- C391. Standard thicknesses, weights, and tolerances of sheet metal (customary practice). 1931.
- C392. Testing of timepieces. 1931. (Supersedes C51. Superseded by C432).
- C393. Reclaimed rubber. 1931.
- C394. Design of gas burners for domestic use. 1931.
- C395. Zinc and its alloys. 1931.
- C396. Architectural acoustics. 1931. (Supersedes C380. Superseded by C418).
- C397. Safety for the household. 1932. (Supersedes C75).
- C398. Standard samples (general information). 9th ed. 1932. (Supersedes C25). Free from Bureau.
- Supplement. Standard samples issued or in preparation by the National Bureau of Standards. Dec. 11, 1946. (Supersedes previous Supplements). Free from Bureau.
- C399. Standard time throughout the world. 1932. (Supersedes C280. Superseded by C406).
- C400. Inks. C. E. Waters. 1932. (Supersedes C95. Superseded by C413).
- C401. Abstracts and summaries of the Bureau of Standards publications on stray-current electrolysis. E. R. Shepherd. 1933.
- C402. Sundials. R. E. Gould. 1933. 5c.
- C403. A discussion of some of the principles of acoustical insulation. V. L. Chrisler. 1933.
- C404. Cautions regarding gas-appliance attachments. John H. Eiseman. 1934. 5c.
- C405. Standards for gas service. 1934. (Supersedes C32). 20c.
- C406. Standard time throughout the world. R. E. Gould 1935. (Supersedes C399).
- C407. Standards for paper towels. Bourdon W. Scribner and Russel W. Carr. 1935. (Supersedes C294). 5c.
- C408. Information for the amateur designer of transformers for 25- to 60-cycle circuits. Herbert B. Brooks. 1935. 5c.
- C409. Production, heat treatment, and properties of iron alloys. Louis Jordan. 1936. 15c.
- C410. National standard petroleum oil tables. 1936. 40c.
- Supplement. Abridged volume correction tables for petroleum oils. 1937. 5c.
- C411. Organic plastics. Gordon M. Kline. 1936. 5c.
- C412. Silver: Its properties and industrial uses. B. A. Rogers, Irl C. Schoonover, and Louis Jordan. 1936. 10c.
- C413. Inks. C. E. Waters. 1936. (Supersedes C400. Superseded by C426).
- C414. American standard specification for dry cells and batteries. 1937. (Supersedes C390. Superseded by C435).
- C415. Magnetic testing. Raymond L. Sanford. 1937. (Supersedes C17. Superseded by C456).
- C416. Gallonage tables for horizontal cylindrical tanks with flat ends. Elmer L. Pepper. 1937. 5c.
- C417. Gas calorimeter tables. 1938. (Supersedes C65).
- C418. Architectural acoustics. Paul R. Heyl and V. L. Chrisler. 1938. (Supersedes C396). 5c.
- C419. Shoe constructions. Roy C. Bowker. 1938. 10c.
- C420. Propane, butane, and related fuels. E. R. Weaver. 1938. 5c.
- C421. Spectral-transmissive properties and use of colored eye-protective glasses. W. W. Coblentz and R. Stair. 1938.
- C422. Methods of testing hosiery. E. Max Schenke and Howard E. Shearer. 1938. 15c.
- C423. Microscopic methods used in identifying commercial fibers. Thora M. Plitt. 1939.
- C424. Washing, cleaning and polishing materials. F. W. Smither. 1939. (Supersedes C383). 20c.
- C425. Legal weights per bushel for various commodities. R. W. Smith. 1940. (Supersedes C10). 5c.
- C426. Inks. C. E. Waters. 1940. (Supersedes C413). 15c.
- C427. Synthetic rubbers: A review of their composition, properties, and uses. Lawrence A. Wood. 1940. 10c.
- C428. A test of lens resolution for the photographer. Irvine C. Gardner. 1940. 40c.
- C429. Photoelectric tristimulus colorimetry with three filters. Richard S. Hunter. 1942. 15c.

- C430. Glass stopcocks. Martin Shepherd. 1941. 10c.
 C431. Typewriter ribbons and carbon paper. C. E. Waters. 1941. 10c.
 C432. Testing of timepieces. R. E. Gould. 1941. (Supersedes C392). 15c.
 C433. Physical properties of dental materials. Wilmer Souder and George C. Paffenbarger. 1942. \$1.00.
 C434. Testing of glass volumetric apparatus. Elmer L. Peffer and Grace C. Mulligan. 1941. (Supersedes C9). 10c.
 C435. American standard specification for dry cells and batteries. 1942. (Supersedes C414. Superseded by C466).
 C436. Low-cost glazes for structural clay products. Ray T. Stull and Paul V. Johnson. 1942. 10c.
 C437. Optical and mechanical characteristics of 16-millimeter motion-picture projectors. Robert E. Stephens. 1942. 10c.
 C438. Static electricity.....Francis B. Silsbee

The nature and origin of the charges of static electricity arising in industrial processes are discussed, and various methods of mitigation of the hazards which they introduce are suggested. By defining suitable units for the quantities involved and stating quantitative relationships between them, a basis is given for an engineering treatment of the phenomena. June 10, 1942. 36 p. 10c.

- C439. Acoustic performance of 16-millimeter sound motion-picture projectors.

Wilbert F. Snyder

This Circular presents information to assist the prospective purchaser of a motion-picture projector in the preparation of a specification and in the selection of equipment capable of good performance, yet not excessive in cost. Objective test methods are described in detail, and simplified methods of sound measurements are indicated. Although over-all performance of the equipment is stressed, certain difficulties and lack of suitable test film prevent direct measurement of some of these characteristics. Measurements on representative equipment are included. Improvements in 16-mm sound projectors are suggested. July 6, 1942. 56 p. 15c.

- C440. Polarimetry, saccharimetry, and the sugars.

This Circular supersedes National Bureau of Standards Circular No. 12, issued July 6, 1906, and Circular No. 44, issued January 15, 1914, and revised November 1, 1917. The main purpose of this treatise is to explain the application and manipulation of polarized light for industrial, analytical, and theoretical purposes. May 1, 1942. 810 p. \$2.75 (bound in blue buckram).

- C441. Elevator wire rope maintenance.

Executive Committee for the American Standard Safety Code for Elevators, Dumbwaiters, and Escalators

This service bulletin covers the items affecting rope life, which include lack of lubrication, unequal tensions, misalignment of sheaves, lack of maintenance of sheave grooving, poor brake setting, unduly high peaks of acceleration and retardation, and changes in top and bottom hoistway clearances. It discusses methods of checking and correcting these particular items, and closes with a suggestion that rope life be extended further by decreasing elevator service, either by running fewer cars or by establishing skip stops, or by similar methods. Dec. 7, 1942. 7 p. 5c.

- C442. Maintenance of elevator mechanical safety appliances.

Executive Committee for the American Standard Safety Code for Elevators, Dumbwaiters, and Escalators

This Circular covers the items affecting the proper operation of governors, safeties, and buffers. Governor items include clearances, driving-sheave wear, sluggish action, and condition of jaws and of governor rope. The functional requirements of the releasing carrier are discussed in detail. This is followed by a general paragraph on the function of undercar safeties. There are also paragraphs on cleaning and maintenance of safeties and a discussion of various commonly used types of safety equipment. These include instantaneous, flexible guide-clamp, wedge-clamp, and spring-actuated safeties. The need for periodic tests is stressed.

Section III discusses various requirements for guide rails, the need for adequate rail fastenings, the effect of building settlement, maintenance of rail surface, and inspection of rails after the setting of the safety.

Section IV, on buffers, covers the proper grade of oil for oil buffers, importance of maintaining oil level, correct alinement of buffers, anchorage of buffer cases, corrosion of metallic parts, and flooding.

A paragraph is devoted to the checking of alinement and supports of spring buffers. Jan. 9, 1943. 10 p. 5c.

C443. Maintenance of elevator hoistway and car enclosures and equipment.
Executive Committee for the American Standard Safety Code for Elevators,
Dumbwaiters, and Escalators

This Circular includes a brief discussion of elevator accidents, stressing the large percentage occurring at hoistway entrances, and then discusses in some detail the protective devices for hoistway doors and the methods of maintaining such devices in the best operating condition. Instructions on the care of floors at elevator entrances are given, and the need for maintaining threshold illumination is stressed. The value of paint or other protective coatings on machine-room and hoistway walls is brought out. March 8, 1943. 8 p. 5c.

C444. Maintenance of elevator hoisting machines and brakes.
Executive Committee for the American Standard Safety Code for Elevators,
Dumbwaiters, and Escalators

This Circular covers certain suggestions for the inspection and checking of elevator hoisting equipment, including motors, gearing, brakes, and driving sheaves and drums. The inspection of belted machines is covered briefly, and there is a paragraph devoted to overhead sheaves and bearings. Motor-generator sets are covered by cross reference to similar equipment used in hoisting machines. March 15, 1943. 6 p. 5c.

C445. Effect of humidity on physical properties of paper. Frederick T. Carson

To make available data that have been out of print for some time, an old publication by the National Bureau of Standards has been revised and the essential data presented again. The data are included in seven tables and six graphs. They show the variation with humidity of basic ream weight, bursting strength, tearing resistance, folding endurance, tensile strength, and stretch. References to the literature are included to supplement the information. Jan. 31, 1944. 12 p. 5c.

C446. Dead-weight machines of 111,000- and 10,100-pound capacities.
Bruce L. Wilson, Douglas R. Tate, and George Borkowski

A dead-weight testing machine of 102,000-lb capacity was installed at the National Bureau of Standards in 1927 to provide means for calibrating elastic calibration devices, which are used to calibrate force-indicating testing machines. To obtain a larger number of test loads the original machine was altered by the addition of nine 1,000-lb weights and an operating mechanism. To obtain the smaller test loads necessary for the calibration of elastic calibration devices having smaller capacities, a new machine of 10,000-lb capacity was installed. The two machines are described, and the errors of the weights of the machines are discussed. June 1943. 14 p. 5c.

C447. Mechanical properties of metals and alloys.
John L. Everhart, W. Earl Lindlieff, James Kanegis, Pearl G. Weissler, and
Frieda Siegel

This Circular is a summary of the results of a comprehensive survey of the technical literature on the strength and related properties, thermal expansion, and thermal and electrical conductivities of ferrous and nonferrous metals and alloys at normal, high, and low temperatures. In general, the data are presented in tabular form, although graphical representation is often used to indicate the effects of changing composition or conditions on the properties. Data on aluminum, copper, iron and steel, lead, magnesium, nickel, tin, zinc, a number of miscellaneous metals, and their alloys are included. The Circular is not limited to conventional engineering materials but contains the data on properties of many materials not usually classed as such. Literature references to the sources of the data are included. Dec. 1, 1943. 481 p. \$2.25 (buckram bound).

C448. Permanent magnets. Raymond L. Sanford

This Circular gives general information regarding the composition, treatment, and properties of permanent-magnet materials and the design and testing of permanent magnets. Aug. 10, 1944. 39 pp. 10c.

C449. Hydrometer correction tables and thermal density coefficients for vegetable tanning extracts. M. G. Blair and E. L. Peffer

Tables are presented for correcting hydrometer readings made in vegetable tanning extracts at observed temperature in degrees barkometer, in degrees Twaddle, and in degrees Baumé to readings at the standard temperature 60°F. Thermal density coefficients are also included, which make possible the calculation of the density of a tanning extract at any temperature within the range of the investigation if its specific gravity at 60°/60°F is known. These tables are based on an investigation carried out by the National Bureau of Standards on the density and thermal expansion of

several vegetable tanning extracts — quebracho, oak bark, hemlock bark, chestnut, and mangrove bark extracts. The range is from 1.00 to 1.12 specific gravity at 60°/60°F and from 50° to 100°F. May 4, 1945. 24 p. 10c.

C450. Underground corrosion.....Kirk H. Logan

This circular is a summary of the results of the National Bureau of Standards investigations of underground corrosion which began in 1922. Relations between the physical and chemical properties of the soil and their corrosiveness are described. The results of field tests of commonly used ferrous materials, ferrous alloys, lead, copper, copper alloys, zinc, asbestos-cement and a number of metallic and non-metallic coatings are given. Results of extensive field tests on bituminous pipe coatings made with the cooperation of the American Gas Association and American Petroleum Institute are also given. Methods of testing soils and coatings are described and their usefulness discussed. The theory and application of cathodic protection to underground structures are described. Details of test methods and apparatus are given in six appendices. Nov. 27, 1945. 312 p. \$1.25. (buckram bound).

C451. Factors affecting results obtained with the Mooney Viscometer.

Rolla H. Taylor

Experience with the operation of the Mooney Viscometer in 18 laboratories indicates the need for better reproducibility of results. A study of the available data from these laboratories along with numerous experiments made at the National Bureau of Standards have shown the factors that must be considered in improving the reproducibility. If uniformity in the values of Mooney viscosity on the same sample with different viscometers and in different laboratories is to be obtained, the methods of adjustment that must be followed and the precautions that must be taken are cleaning, mechanical calibration, dimensions of dies, die holders, and rotors, die closures, and preparation of test pieces. Each of these items are the errors which may result from maladjustments and lack of precautions in the use of this instrument are discussed. Nov. 8, 1945. 14 p. 5c.

C452. Slip casting of clay pots for the manufacture of optical glass at the National Bureau of Standards.

Raymond A. Heindl, Gordon B. Massengale, and Louis G. Cossette

Between 1918 and 1940 the Refractories Section of the National Bureau of Standards manufactured about 70 slip-cast clay pots annually for use by the Glass Section for the production of optical glass. From 1940 to 1945, to meet the increasing military requirements for optical glass, the pot production was expanded gradually to a maximum of 2,300 annually. This Circular describes the plant changes made, the new machinery and equipment installed, and the general manufacturing procedure used to bring about this increased production. A description is also given of the two types of pots produced, namely, one with a low-porosity lining for the manufacture of the more corrosive glasses, the other without the lining for the less corrosive glasses. Information is given on the control of the density of the pot in order to obtain low gas permeability of the pot wall and on many of the difficulties that had to be overcome in order to produce satisfactory pots. July 15, 1946. 19 p. 10c.

C453. Apparatus for determining water-vapor permeability of moisture barriers.

Frederick T. Carson and Vernon Worthington

A conditioning and testing cabinet is described in which the hygrometric conditions are maintained by equilibrium with a saturated solution of an appropriate salt. The temperature of this solution and of the testing chamber is held constant by means of an envelope of moving air that completely surrounds the testing chamber, an open-coil heater and a thermoregulator being used to control the temperature of this air bath. Devices for supporting and weighing the permeability cells in the cabinet, without disturbing the hygrometric conditions, are explained in detail. The cells, hung by hooks from a rotary suspension disk, can be suspended one at a time from a weighing rod attached to a balance. Interlocking mechanisms for selecting and picking up the cells facilitate the weighing and protect the apparatus and the permeability cells from accidental injury. A method and apparatus for mounting the specimens in the permeability cells are described also. Materials covering a large permeability range can be accommodated. Some suggestions are made for accelerating the testing of good moisture barriers. Nov. 8, 1946. 18 p. 10c.

C454. Proving rings for calibrating testing machines.

Bruce L. Wilson, Douglas R. Tate, and George Borkowski

A description is given of the proving ring, which was developed at the National Bureau of Standards to provide an accurate portable load-measuring device for calibrating testing machines. Methods are described for calibrating proving rings by

dead weights for loads up to 111,000 lb and by means of other calibrated proving rings for higher loads. Rings which complied with the specification included in the paper were subjected to tests to determine the errors introduced by variations of the conditions of use. Provided reasonable care is exercised in using proving rings, the errors are shown to be small compared to ± 1 percent, the generally recognized tolerance for testing machines. Aug. 14, 1946. 21 p. 10c.

C455. Flameproofing of textiles.....M. W. Sandholzer

This Circular includes a review of the history and principles of flameproofing; an outline of types of treatments and the more common processes, formulas, and testing methods; and a brief list of references on the general subject. A testing method is also outlined for indicating the relative hazard of untreated textiles and those rendered more flammable by processing or coating. Aug. 23, 1946. 20 p. 10c.

C456. Magnetic testing.....Raymond L. Sanford

This Circular gives general information regarding magnetic quantities, the magnetic characteristics of materials, the principles employed in magnetic testing apparatus, and a brief discussion of the theory and application of magnetic analysis. Nov. 6, 1946. 39 p. 10c.

C457. Weights per United States gallon and weights per cubic foot of sugar solutions.

Carl F. Snyder and Lester D. Hammond

A table is presented showing the weights per United States gallon and weights per cubic foot of sugar (sucrose) solutions at 20°C. The table comprises the weights (metric and avoirdupois) per gallon in air; weights (avoirdupois) per cubic foot in air; true specific gravities 20°/20°C and 20°/40°C; apparent specific gravities; grams of sucrose per 100 ml of solution in vacuum; and degrees Baumé; all from 0° to 95° Brix. at intervals of 0.1° Brix. The calculations are based on the density values of Plato. The degrees Baumé are taken from the table of Bates and Bearce. A supplementary table is included, giving the weights per gallon in air at different temperatures.

This Circular is a revision of Circular C375 (1929); it also replaces Letter Circular LC770. Dec. 5, 1946. 28 p. 10c.

C458. Chemistry of collagen.....Joseph R. Kanagy

One of the most important industrial proteins is collagen. On treatment with tannins or certain inorganic salts, it is converted into leather. This process is known as tanning. By prolonged heating with water, collagen is changed into glue which has a large number of commercial applications, such as the making of paper, photographic plates and adhesives. This Circular gives a general outline of the physical and chemical properties of collagen and was prepared for the large number of chemists employed in industries where this material or its transition product, glue, is processed. May 29, 1946. 26 p. 10c.

C459. Announcement of changes in electrical and photometric units.

This Circular gives a short account of the development of new international agreements on practical units of electricity and of light. In pursuance of these agreements, the electrical units based upon the resistance of a column of mercury and the rate of deposition of silver in a voltameter will be superseded on January 1, 1948, by units derived from the fundamental mechanical units of length, mass, and time. This will increase the numerical values of resistances by 495 parts per million and those of voltages by 330 parts per million. The magnitude of photometric units will be fixed by assigning the value 60 candles per square centimeter for the brightness of a black-body radiator at the temperature of freezing platinum, and using certain standard spectral luminosity factors for the measurement of light differing in color from that of the black-body primary standard. This change in definitions of the units will involve little change in ratings of the common types of lamps. May 15, 1947. 7 p. 5c.

C460. Publications of the National Bureau of Standards, 1901 to June 30, 1947.

This Circular lists titles of the publications of the National Bureau of Standards from 1901 to June 30, 1947, with subject and author indexes.

For the period from January 1, 1942, to June 30, 1947, brief abstracts are included with the titles of the publications. 75c.

C461. Tables of selected values of properties of hydrocarbons.

Frederick D. Rossini, Kenneth S. Pitzer, William J. Taylor, John E. Kilpatrick, Joan P. Ebert, Charles W. Buckett, Mary G. Williams, Helene G. Werner

This book includes, in bound form, all the tables of properties of hydrocarbons (and certain closely related compounds) which have been issued as of May 31, 1947

by the American Petroleum Institute Research Project 44. Some explanatory remarks, and tables of fundamental constants, conversion factors, and molecular weights, are also included. \$2.75 (buckram bound).

C462. Ionospheric Radio Propagation.

This book presents the elementary principles of sky-wave radio propagation at high frequencies and their application to the problems of radio communication. The basic theory of electromagnetic wave propagation is given together with a detailed discussion of the structure of the ionosphere and the manner in which it reflects radio waves. Practical methods of calculating radio propagation conditions are given together with explanations of their derivation. In press.

C463. Safety for the household.....Stewart J. Owen

In this Circular consideration is given to the hazards (chemical, drugs and medicines, electrical, fire, gas, lightning, mechanical, gardening and yard tools, hand tools, home work-shop power tools, poisonous plants and vines often found in yards and gardens, etc.) and recommendations are made to eliminate those hazards or to cope with them where they cannot easily be eliminated. Methods of first aid are given including resuscitation, home treatment of burns, scalds, cuts and bruises. Information is given on the instruction of children in safe habits and of the value of organized community safety programs. Helpful suggestions are made for the building of a safe home and the installation in the home of approved equipment such as heating boilers, laundry and plumbing fixtures. Supersedes C397. 75c.

HANDBOOKS

These are recommended codes of engineering and industrial practice, including safety codes, developed in cooperation with the national organizations and others concerned. In many cases the recommended requirements are given official status through their incorporation in local ordinances by State and municipal regulatory bodies.

- H1. Manual of inspection and information for weights and measures officials. 1918. (Supersedes M1. Superseded by H11).
- H2. National safety code for the protection of the heads and eyes of industrial workers. 1920. (Superseded by H24).
- H3. National electrical safety code. 1920. (Supersedes C54 to be superseded by H30).
- H4. Discussion of the national electrical safety code. 1920. (Supersedes C54).
- H5. American logging and sawmill safety code. 1923. 60c.
- H6. Safety rules for the installation and maintenance of electrical supply stations. 1926. (Superseded by H31).
- H7. Safety rules for the installation and maintenance of electric utilization equipment. 1926. (Superseded by H33).
- H8. Rules for the operation of electrical equipment and lines. 1926. (Superseded by H34).
- H9. Safety rules for radio installation. 1926. (Superseded by H35).
- H10. Safety rules for the installation and maintenance of electrical supply and communication lines. 1927. (Superseded by H32).
- H11. Weights and measures administration. 1927. (Supersedes H1. Superseded by H26).
- H12. (Formerly M92). Code for protection against lightning. 1929. (Superseded by H17).
- H13. (Formerly M95). Protection against lightning. 1929.
- H14. (Formerly M85). Specifications and tolerances for commercial weighing and measuring devices. 1929. (Superseded by H22).
- H15. X-ray protection. 1931. (Superseded by H20).
- H16. Wood poles for overhead electrical lines. 1931.
- H17. Code for protection against lightning. 1932. (Supersedes H12. Superseded by H21).
- H18. Radium protection for amounts up to 300 milligrams. 1934. (Superseded by H23).
- H19. Manual of fire-loss prevention of the Federal fire council. 1934. 2d ed., 1945, issued by Federal Works Agency. 30c.
- H20. X-ray protection. 1936. (Supersedes H15). 10c.
- H21. Code for protection against lightning. 1937. (Supersedes H12 and H17. Superseded by H40).
- H22. Specifications, tolerances, and regulations for commercial weights and measures and weighing and measuring devices. 1938. (Supersedes H14. Superseded by H29).
- H23. Radium protection. 1938. (Supersedes H18). 10c.
- H24. American Standard safety code for the protection of heads, eyes, and respiratory organs. 1938. (Supersedes H2). 20c.
- H25. Screw-thread standards for Federal services, 1939. (Superseded by H28).
- H26. Weights and measures administration. R. W. Smith. 1941. (Supersedes H11). 75c.
- H27. Safe handling of radioactive luminous compound. 1941. 10c.
- H28. Screw-thread standards for Federal services. 1942. (Supersedes H25. Superseded by H28, 1944).
- H31. Safety rules for the installation and maintenance of electrical supply stations. 1940. (Supersedes H6). 10c.
- H32. Safety rules for the installation and maintenance of electric supply and communication lines. 1941. (Supersedes H10). 75c.
- H33. Safety rules for the installation and maintenance of electric utilization equipment. 1940. (Supersedes H7). 20c.
- H34. Safety rules for the operation of electric equipment and lines. 1938. (Supersedes C49 and H8). 20c.
- H35. Safety rules for radio installations. 1939. (Supersedes H9). 15c.
- H36. Safety rules for electric fences. 1940. 10c.
- H28. (1944). Screw-thread standards for Federal services.

The purpose of this handbook is to present complete dimensional data upon which specifications may be based for threaded products for Government requirements. So

far as practicable, these data are intended to conform to generally accepted commercial practice, although certain special requirements of the Government necessitate the inclusion of some standards not generally applicable outside of the Government services. References are cited throughout the text to the standards promulgated by the American Standards Association, and to such other published standards as are in agreement with the specifications herein. Feb. 17, 1945. 274 p. \$1.00. Supersedes H28 (1942).

H29. Specifications, tolerances, and regulations for commercial weighing and measuring devices. Ralph W. Smith

The specifications, tolerances, and regulations published herein comprise all of the current codes as adopted by the National Conference on Weights and Measures, the latest action reported having been taken by the 1941 Conference. The material relates to: apparatus in the metric system, linear measures, fabric-measuring devices, taximeters, odometers, liquid capacity measures, glass graduates, single-service measure-containers (except milk bottles), milk bottles, lubricating-oil bottles, liquid-measuring devices, grease-measuring devices, vehicle tanks, dry capacity measures, berry baskets or boxes, scales, weights; and general regulations relating to position of weighing or measuring device. Sept. 26, 1942. 148 p. 60c. (buckram bound). Supersedes H22.

H30. National electrical safety code.

The National Electrical Safety Code combines five separate parts of the code which have been issued as National Bureau of Standards handbooks H31 to H35, inclusive. The five parts of the code include definitions of terms used in the code, grounding rules, safety rules for the installation and maintenance of electric supply stations, safety rules for the installation and maintenance of electric supply and communication lines, safety rules for the installation and maintenance of electric utilization equipment, safety rules for the operation of electric equipment and lines, and safety rules for radio installations. 1948. (Supersedes H3). \$1.25 (buckram bound).

H37. Testing of weighing equipment. Ralph W. Smith

A manual for State and local weights and measures officials, describing various types of commercial weighing equipment, the principles of their operation, and methods for their inspection and test. Jan. 31, 1945. 184 p. \$1.00.

H38. Protection of radium during air raids. L. F. Curtiss

This Handbook contains the recommendations of a special committee appointed by the Director to draft regulations to protect individuals from effects of dispersal of radium during air raids and to provide adequate safeguards for the radium under such conditions. May 4, 1942. 17 p. 10c.

H39. Discussion of the National Electrical Safety Code. Part 2 and Grounding Rules. National Bureau of Standards Advisory Committee for the Preparation of the Discussion Handbook.

This Handbook is a discussion of Part 2 of the Fifth Edition of the National Electrical Safety Code, published as Handbook H32, Safety Rules for the Installation and Maintenance of Electric Supply and Communication Lines. It covers the more important revised requirements in Handbook H32, as well as others that, although substantially unchanged, can be effectively supplemented by a discussion. Three appendices are included. These contain technical data that will be helpful in making computations of the strengths of supporting structures and in determining crossing clearances. In some cases there are suggested engineering short cuts that give approximately the same results as formulas covered in the code. The material was prepared by the National Bureau of Standards Advisory Committee for the Preparation of the Discussion Handbook. July 15, 1944. 162 p. \$1.00 (buckram).

H40. Code for protection against lightning.

This American Standard Code gives basic rules for the protection of persons (part I), protection of buildings and miscellaneous property (part II), and protection of structures containing inflammable liquids and gases (part III).

Detailed specifications are included on number, size, and form of points and rods, grounds, etc., together with detailed instructions for bonding metal roofs and metal-clad buildings.

Sketches of protector masts and the resulting "cone of protection" are included. A discussion of the origin, characteristics, and effects is included as Appendix A, while Appendix B, consisting of a rather full bibliography, completes the publication. March 22, 1945. 99 p. 20c. Supersedes H21.

MISCELLANEOUS PUBLICATIONS

As the name implies, this series includes material, which, because of its character or because of its size, does not fit into any of the other regular publication series. Some of these are charts, administrative pamphlets, directories of specifications, annual reports, weights and measures conference reports, and other subjects appropriate to the Miscellaneous series.

- M1. Manual of inspection and information for weights and measures officials. 1918. (Superseded by H1).
- M2. The international metric system of weights and measures. 1906.
- M3. The international metric system. (Chart). 40c.
- M4. First annual conference on the weights and measures of the United States. 1905.
- M5. Second annual conference on the weights and measures of the United States. 1906.
- M6. Third annual conference on the weights and measures of the United States. 1907.
- M7. Fourth annual conference on the weights and measures of the United States. 1908.
- M8. Fifth annual conference on the weights and measures of the United States. 1910.
- M9. Sixth annual conference on the weights and measures of the United States. 1911.
- M10. Seventh annual conference on the weights and measures of the United States. 1912.
- M11. Eighth annual conference on the weights and measures of the United States. 1913.
- M12. Ninth annual conference on the weights and measures of the United States. 1914.
- M13. Tenth annual conference on the weights and measures of the United States. 1915.
- M14. Eleventh annual conference on the weights and measures of the United States. 1916.
- M15. Some technical methods of testing miscellaneous supplies, including paints and paint materials, inks, lubricating oils, soaps, etc. 1916.
- M16. Report to the international committee on electric units and standards. 1912.
- M17. Copper-wire table (English and metric). 1919.
- M18. National Bureau of Standards — description of work of Bureau. 1911. (Superseded by C1).
- M19. Proceedings of the second annual textile conference held at the Bureau of Standards. 1917.
- M20. Laws concerning the weights and measures of the United States. 1st ed. 1904. State and national laws concerning the weights and measures of the United States. 3d ed. 1926. \$2.30.
- M21. Metric manual for soldiers. 1918.
- M22. Annual report of the Director of the National Bureau of Standards for the fiscal year ended June 30, 1902.
- M23. Annual report of the Director of the National Bureau of Standards for the fiscal year ended June 30, 1903.
- M24. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce and Labor for the fiscal year ended June 30, 1904.
- M25. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce and Labor for the fiscal year ended June 30, 1905.
- M26. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce and Labor for the fiscal year ended June 30, 1906.
- M27. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce and Labor for the fiscal year ended June 30, 1907.
- M28. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce and Labor for the fiscal year ended June 30, 1908.
- M29. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce and Labor for the fiscal year ended June 30, 1909.
- M30. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce and Labor for the fiscal year ended June 30, 1910.
- M31. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce and Labor for the fiscal year ended June 30, 1911.

- M32. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce and Labor for the fiscal year ended June 30, 1912.
- M33. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce for the fiscal year ended June 30, 1913.
- M34. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce for the fiscal year ended June 30, 1914.
- M35. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce for the fiscal year ended June 30, 1915.
- M36. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce for the fiscal year ended June 30, 1916.
- M37. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce for the fiscal year ended June 30, 1917.
- M38. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce for the fiscal year ended June 30, 1918.
- M39. Household weights and measures. (Card). 2d ed. 1920.
- M40. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce for the fiscal year ended June 30, 1919.
- M41. Report of the twelfth annual conference on weights and measures. 1919.
- M42. Progress report of the National Screw Thread Commission. 1921.
- M43. Thirteenth annual conference on the weights and measures of the United States. 1920. 20c.
- M44. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce for the fiscal year ended June 30, 1920.
- M45. Buying commodities by weight or measure. 1920.
- M46. War work of the Bureau of Standards. 1921.
- M47. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce for the fiscal year ended June 30, 1921.
- M48. Fourteenth annual conference on the weights and measures of the United States. 1921. 20c.
- M49. Graphic comparison of screw thread pitches. 1922.
- M50. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce for the fiscal year ended June 30, 1922.
- M51. Fifteenth annual conference on the weights and measures of the United States. 1922. 15c.
- M52. Mollier chart of properties of ammonia. 1923. (Included in C142).
- M53. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce for the fiscal year ended June 30, 1923.
- M54. A standard state zoning enabling act. 1924. (Reissued as BH5).
- M55. Sixteenth annual conference on the weights and measures of the United States. 1923. 30c.
- M56. Tables and graphs for facilitating the computation of spectral energy distribution by Planck's formula. 1925.
- M57. Large Mollier chart. 1924.
- M58. Technical conference of state utility commission engineers. 1923.
- M59. Seventeenth annual conference on the weights and measures of the United States. 1924. 35c.
- M60. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce for the fiscal year ended June 30, 1924.
- M61. 1924 report of the National Screw Thread Commission.
- M62. Table of Brinell hardness numbers. 1924.
- M63. Report of board of visitors to Bureau of Standards of the Department of Commerce for the Secretary of Commerce. 1923.
- M64. The standard weights and measures of the United States. 1925.
- M65. National directory of commodity specifications: classified and alphabetical lists and brief descriptions of existing commodity specifications. 1925. (Superseeded by M130).
- M66. Second Technical Conference of State Utility Commission Engineers. 1924.
- M67. Kilocycle-meter conversion table. 1925.
- M68. Adjust your headlights. 1925.
- M69. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce for the fiscal year ended June 30, 1925.
- M70. Report of eighteenth national conference on weights and measures of the United States. 1925. 50c.
- M71. Compressibilities of gases. 1925.
- M72. Strain lines developed by compressive tests on structural members of the Delaware River Bridge at the United States Bureau of Standards for the Delaware River Bridge Joint Commission. 1926.

- M73. Subject index of United States Government Master specifications. 1926. (Superseded by C319).
- M74. Report of nineteenth national conference on weights and measures. 1926.
- M75. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce for the fiscal year ended June 30, 1926.
- M76. Mollier chart, properties of ammonia. 1927. 10c.
- M77. Standards yearbook, 1927.
- M78. Standard atmosphere chart. 1927. (Superseded by M82).
- M79. Standards and specifications in the wood-using industries. 1927.
- M80. Report of the twentieth national conference on weights and measures. 1927. 45c.
- M81. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce for the fiscal year ended June 30, 1927.
- M82. Standard atmosphere chart. 1927. (Supersedes M78).
- M83. Standards yearbook, 1928. \$1.00.
- M84. Standard time conversion chart. 2d ed. 1931.
- M85. Specifications and tolerances for commercial weighing and measuring devices. 1929. (Supersedes H1 and C61. Superseded by H22).
- M86. Tables of spectral energy distribution and luminosity for use in computing light transmissions and relative brightness from spectrophotometric data. 1929. 10c.
- M87. Report of the twenty-first national conference on weights and measures. 1928. 35c.
- M88. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce for the year ended June 30, 1928.
- M89. Report of the National Screw Thread Commission. 1928. (Supersedes M61. Superseded by H28).
- M90. Directory of commercial testing and college research laboratories. 1927. (Superseded by M125).
- M91. Standards yearbook, 1929. \$1.00.
- M92. Code for protection against lightning. 1929. (Superseded by H21).
- M93. Visitors' manual of the National Bureau of Standards. 1929. (Superseded by M134).
- M94. Scientific and technical positions in the Bureau of Standards. 1929. (Superseded by M152).
- M95. Protection against lightning. 1929. (Reissued as H13).
- M96. Organizations cooperating with the National Bureau of Standards. 1930.
- M97. Thermal properties of petroleum products. 1929. 15c.
- M98. American national screw thread tables for shop use. I. Standard threads (coarse and fine thread series). 1929.
- M99. American national screw thread tables for shop use. II. Special threads. 1929.
- M100. Plain and threaded plug and ring gage blanks. 1930. (Superseded by CS8).
- M101. Report of twenty-second national conference on weights and measures. 1929. 30c.
- M102. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce for the fiscal year ended June 30, 1929.
- M103. Weights and measures references. Including an index to the reports of the national conference on weights and measures from the first to the twenty-first, inclusive. 1930.
- M104. Testing equipment for large-capacity scales for the use of weights and measures officials. 1930. 10c.
- M105. Certification plan — significance and scope. 1930.
- M106. Standards yearbook, 1930. 75c.
- M107. Safety code for brakes and brake testing. 1930.
- M108. The manufacture and properties of a cellulose product (maizolith) from cornstalks and corncobs. 1930.
- M109. Chart for determining the helix angles of screw threads. 1930.
- M110. Standards and specifications for nonmetallic minerals and their products. 1930.
- M111. Standard time zones of the United States and adjacent parts of Canada and Mexico. (Map). 1930. (Superseded by M155).
- M112. Manufacture of insulating board from cornstalks. 1930.
- M113. Simplification of sizes and terminology of high volatile bituminous coal. 1930. 5c.
- M114. Filters for the reproduction of sunlight and daylight and the determination of color temperature. 1931. 45c.

- M115. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce for the fiscal year ended June 30, 1930.
- M116. Report of the twenty-third national conference on weights and measures. 1930. 35c.
- M117. Units used to express the wave lengths of electromagnetic waves. 1930.
- M118. The optical rotation of liquids, its variation with wave length, temperature, solvent, and concentration. T. Martin Lowry. 1932. 10c.
- M119. Standards yearbook, 1931. \$1.00.
- M120. Standards and specifications for metals and metal products. George A. Ward-law. 1933.
- M121. Units of weight and measure (United States customary and metric) definitions and tables of equivalents. 1936. (Supersedes C47). 30c.
- M122. Weights and measures in Congress. Sarah Ann Jones. 1936.
- M123. Production of pressboard from cornstalks. Baker Wingfield, T. R. Naffziger, E. R. Whittemore, C. B. Overman, O. R. Sweeney, and S. F. Acree. 1936. 5c.
- M124. Paper pulp from cereal straws by a modified sulfate process. Baker Wingfield, T. R. Naffziger, E. R. Whittemore, C. B. Overman, O. R. Sweeney, and S. F. Acree. 1936. 5c.
- M125. Directory of commercial testing and college research laboratories. Ann E. Rapuzzi. 1936. (Supersedes M90. Superseded by M171).
- M126. Temperature interconversion tables ($^{\circ}\text{C} \rightleftharpoons ^{\circ}\text{F}$) and melting points of the chemical elements. 1937. (Supersedes C35. Superseded by M183).
- M127. Permeability of membranes to water vapor with special reference to packaging materials. Frederick T. Carson. 1937. 5c.
- M128. A survey of storage conditions in libraries relative to the preservation of records. 1931.
- M129. Report of twenty-fourth national conference on weights and measures. 1931. 50c.
- M130. National directory of commodity specifications. Clarence W. Ingels. 1932. (Supersedes M65. Superseded by M178).
- M131. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce for the fiscal year ended June 30, 1931.
- M132. Properties of fiber building boards. 1931.
- M133. Standards yearbook, 1932.
- M134. Visitor's manual of the Bureau of Standards. Hugh G. Boutell. 1932. (Supersedes M93. Superseded by M153).
- M135. The international metric system of weights and measures. William Parry. 1932. 10c.
- M136. Bibliography on standardization. Anne L. Baden. 1932.
- M137. Paint for priming plaster surfaces. Percy H. Walker and E. F. Hickson. 1932.
- M138. Annual report of the Director of the Bureau of Standards to the Secretary of Commerce for the fiscal year ended June 30, 1932.
- M139. Standards yearbook, 1933.
- M140. A study of deterioration of book papers in libraries. Arthur E. Kimberly and Adelaide L. Emley. 1932. 5c.
- M141. Report of the National Screw Thread Commission. 1933. (Supersedes previous reports. Superseded by H28).
- M142. A study of the removal of sulphur dioxide from library air. Arthur E. Kimberly and Adelaide L. Emley. 1933. 5c.
- M143. Psychrometric charts. Donald B. Brooks. 1933. (Superseded by M146)
- M144. Summary report of Bureau of Standards research on preservation of records. A. E. Kimberly and B. W. Scribner. 1934. (Superseded by M154).
- M145. Preservation of newspaper records. B. W. Scribner. 1934. 5c.
- M146. Psychrometric charts for high and low pressures. Donald B. Brooks. 1935 (Supersedes M143).
- M147. Papermaking quality of cornstalks. Charles G. Weber, Merle B. Shaw, and Martin J. O'Leary. 1935. 5c.
- M148. Separation of cornstalks into long fibers, pith, and fines. E. R. Whittemore, C. B. Overman, and Baker Wingfield. 1935. 5c.
- M149. A basis for a performance specification for women's full-fashioned silk hosiery. Herbert F. Schiefer and Richard S. Cleveland. 1935. 5c.
- M150. Suitability of sweetpotato starch for the beater sizing of paper. Charles G. Weber, Merle B. Shaw, and Martin J. O'Leary. 1935. 5c.
- M151. Design and construction of building exists. 1935. 10c.
- M152. Scientific and technical positions in the National Bureau of Standards. William C. Fewell. 1935. (Supersedes M94. Superseded by M163).

- M153. Visitor's manual of the National Bureau of Standards. Hugh G. Boutell. 1935. (Supersedes M134. Superseded by M160).
- M154. Summary report of National Bureau of Standards research on preservation of records. A. E. Kimberly and B. W. Scribner. 1937. (Supersedes M144). 10c.
- M155. Standard time zones of the United States and adjacent parts of Canada and Mexico. (Map). 1935. (Supersedes M111).
- M156. Report of the twenty-fifth national conference on weights and measures. 1936.
- M157. Report of the twenty-sixth national conference on weights and measures. 1937. 20c.
- M158. Evaluation of motion-picture film for permanent records. John R. Hill and Charles G. Weber. 1937. 5c.
- M159. Report of the twenty-seventh national conference on weights and measures. 1937.
- M160. Visitor's manual of the National Bureau of Standards. Hugh G. Boutell. 1937. (Supersedes M153).
- M161. Report of the twenty-eighth national conference on weights and measures. 1939. 30c.
- M162. Summary report of research at the National Bureau of Standards on the stability and preservation of records on photographic film. B. W. Scribner. 1939. 10c.
- M163. Scientific and technical positions in the National Bureau of Standards. William C. Fewell. 1939. (Supersedes M152).
- M164. Report of the twenty-ninth national conference on weights and measures. 1940. 25c.
- M165. Standardization of packages. 1940. (Reprint from M164). 10c.
- M166. Charts for testing lens resolution. Irvine C. Gardner. 1940.
- M167. Report of the thirtieth national conference on weights and measures. 1941. 55c.
- M168. Protection of documents with cellulose acetate sheeting. B. W. Scribner. 1940. 5c.
- M169. Standardization activities of national technical and trade organizations. Robert A. Martino. 1941. 75c.
- M170. Report of the thirty-first national conference on weights and measures. 1941. 35c.
- M171. Directory of commercial testing and college research laboratories. Ann E. Rapuzzi. 1942. (Supersedes M125. Superseded by M187).
- M172. Index to the reports of the National Conference on Weights and Measures. Ralph W. Smith and William T. McCormac

This publication replaces National Bureau of Standards Miscellaneous Publication M103 with respect to the index of the several Reports of the National Conference on Weights and Measures. The earlier index covered the Conference Reports from the First to the Twenty-first, inclusive; the present publication covers all Conference Reports from the First to the Thirty-first, inclusive. Thus, the large amount of information on a wide variety of weights and measures subjects, which is embraced within the published reports of the proceedings of the National Conference from the first meeting in 1905 through the meeting in 1941, is made more valuable by reason of the means herein provided for locating readily all material on any specific subject and all material presented by any particular speaker. Oct. 14, 1942. 38 p. 10c. (Supersedes M103).

- M173. The grade terminology problem.....Ihler J. Fairchild

Sets forth in digest form the grade terms, designations, and bases for grading or rating for sixty-four commodities and characteristics selected as broadly representative of the various grading and rating systems used in the United States of America. These terminologies and designations are compared in the light of the technical background for each commodity and impartially from the viewpoint of the buyer, seller, the inspection or testing agency, enforceability and provisions for future improvement in a search for the underlying principles and postulates as a general guide in the selection, formulation, or revision of grade designations in the future. Five general conclusions are drawn in order that grade terminology for the future may be further coordinated, simplified, and clarified. March 7, 1944. 29 p.

- M174. American standard building code requirements for masonry. Sectional Committee on Building Code Requirements and Good Practice Recommendations for Masonry — A41.

Building Code Requirements for Masonry (ASA A41.1-1944) is a complete code

of minimum requirements for masonry construction including definitions, requirements for materials, allowable stresses and general requirements for all types of masonry except reinforced masonry. This document, prepared by American Standards Association Sectional Committee A41 under the sponsorship of the National Bureau of Standards, is one of a series of building code standards prepared by various committees under the jurisdiction of the Building Code Correlating Committee of the American Standards Association. The basis of the requirements of this code is discussed in an appendix. Mar. 15, 1944. 37 p. 15c. (Supersedes BH6.)

M175. Antiscatter treatments for glass.

Frank W. Reinhart, Ruth A. Kronstadt, and Gordon M. Kline

The relative effectiveness of various commercial and experimental antiscatter treatments for glass was investigated at the request of the United States Office of Civilian Defense. A vacuum-concussion apparatus was used to test glass treated with lacquers, tapes, plastic films, and adhesive-fabric combinations. The materials which gave satisfactory results as initially applied were subjected to wet-dry cyclic and heat tests to determine the aging characteristics of the antiscatter materials. Only a few materials retained the particles of glass satisfactorily in the vacuum test after subjection to the two accelerated aging tests. A review is included of the experimental work and experiences of the British in developing treatments for glass to prevent it from scattering when fractured by bomb explosions. June 19, 1944. 31 p. 10c.

M176. Nomographs and charts for transmission lines.....J. A. Dickinson

Chart 1 consists of two conductor loading nomographs from which, the vertical, and transverse wind loadings being given, the total conductor loading may be obtained.

Chart 2 consists of: Bending moments due to wind on a pole; and ultimate resisting moments of wood poles.

Chart 3 is the catenary curve giving values of the sag at points on the catenary curve expressed in percent of the center sag.

These are all full size reproductions of charts appearing in much reduced size in Handbook H39, Discussion Handbook, Part 2, N. E. S. C. Aug. 7, 1944. 3 p. 25c.

M177. Tests of instruments for the determination, indication, or recording of the specific gravities of gases.

Francis A. Smith, John H. Eisman, and E. Carrol Creitz

At the request of the American Society for Testing Materials, the National Bureau of Standards completed in 1941 a critical study of instruments available to industry for the determination, indication, or recording of the specific gravities of gases. Instruments were submitted for test by all interested manufacturers.

The study of 11 instruments with 15 test gases of known specific gravities, comprised determinations of accuracy and reproducibility, of the effects of changes of temperature, relative humidity and water content of the surrounding air, and of sources of error and applicable corrections. The test gases ranged in specific gravity from helium (0.15), in steps of approximately 0.15, to butane (2.06). The probable errors in the values of the specific gravities of the test gases and mixtures used as standards of reference averaged ± 0.0004 , which made it possible to fix the errors of the instruments to 0.0001 specific gravity unit. Jan. 20, 1947. 143 p. \$1.00.

M178. National directory of commodity specifications.

P. A. Cooley and A. E. Rapuzzi

This is the third edition of the Directory, issued first in 1925, and again in 1932. It contains an alphabetical list of commodities and a thoroughly classified list of the specifications formulated by organizations having national recognition or agencies speaking with the authority of the Federal Government. A special effort has been made to increase the usefulness of the Directory. Where the use to which a commodity is put is not self evident from the title of the specification, a brief statement of this use is given. There is also given a brief summary of each specification so that the reader may to some extent judge for himself whether the scope of the specification fits his particular need. The detailed plans in accordance with which the Directory has been compiled were formulated or approved by an advisory board composed of representatives of 14 national organizations interested in the preparation and utilization of specifications. The commodity classification utilized represents a consolidation and simplification of Schedules A and B developed many years ago by the Bureau of Foreign and Domestic Commerce and used currently by the War Production Board. June 30, 1945. 1311 p. \$4.00.

M178. (Supplement). Supplement to the National directory of commodity specifications.

This is a Supplement to the revised National Directory of Commodity Specifications issued in 1945. The purpose of the Directory is to list and briefly describe the standards, specifications, and codes that are formulated by all nationally known and recognized trade associations or technical societies as well as the specifications of governmental agencies that represent the Federal Government. An alphabetical index lists individual items under their various trade and technical names, giving their decimal classification numbers in order to facilitate the easy location of any item in the publication. The brief summaries covering technical characteristics, scope, and application aid the readers in selecting the specifications that fit their particular needs. The Directory is a convenient means for locating commodity specifications that are in existence. March 1, 1947. 322 p. \$2.25 (buckram bound).

M179. American standard building code requirements for minimum design loads in buildings and other structures.....George N. Thompson

Recommended minimum requirements for use in building codes are presented covering dead, live, wind, and earthquake loads. These have been prepared by American Standards Association Sectional Committee A58 under the sponsorship of the National Bureau of Standards and constitute one of a series of related standards being developed by various committees under the jurisdiction of the Building Code Correlating Committee of the American Standards Association. An appendix presents information intended to assist local committees and officials in applying the requirements. Oct. 18, 1945. 32 p. 10c.

M180. Carbon brush terminals (electric).....Andrew C. Tait

This publication consists of a chart showing stock sizes, types, and varieties of carbon brush terminals for all kinds of rotating electrical apparatus. This chart is a replica of that included in Simplified Practice Recommendation R210-45, Carbon brush terminals (electrical), and is issued separately, on special request of the industry, for wall display purposes. The wall chart will be on heavy paper, in size 16 x 19 inches. June 1, 1945. 1 p. 5c.

M181. Jar rings for use in home canning; their testing and a proposed specification.
R. H. Taylor, H. G. Wheeler, and F. Benedict

The purpose of this investigation was to correlate properties of jar rings with canning tests conducted at the Bureau of Home Economics. Fifty-four different samples of jar rings obtained from 11 different manufacturers were analyzed for rubber content and measurements were made of tensile strength, ultimate elongation, stress at 100 percent elongation, swelling on processing, indentation by apparatus designed to simulate a jar cap, and hardness. Only the swelling, indentation, and hardness tests made before and after processing bore a relation to the canning failures. The relation was not exact because some failures undoubtedly resulted from excessive variations in the jars and tops. Apparatus was developed for accurately measuring profiles of sealing surfaces. Results of the investigation are expressed in terms of a proposed specification for jar rings. Aug. 29, 1945. 18 p. 10c.

M182. Development of standards for flexible caselining materials.
B. W. Scribner, F. T. Carson and C. G. Weber

An investigation was made to develop improved specifications for sheet materials for lining shipping cases so that the liners would give better service in overseas shipments of supplies, particularly those for our armed forces. The sheetings were given various tests considered to have a bearing on their serviceability, such as strength, stretch, flexibility, resistance to scuffing, puncture, and permeation by water vapor and water. Packages containing the sheetings tested used as liners were subjected to simulated service conditions at a commercial testing laboratory. Correlation of the test data of the sheetings with the results of the simulated service trials indicated the properties that are of importance for satisfactory performance in use. Recommended requirements for these properties are included. Sept. 23, 1946. 23 p. 10c.

M183. Temperature interconversion tables ($^{\circ}\text{C} \rightleftharpoons ^{\circ}\text{F}$) and melting points of the chemical elements.

This four-page chart is a revised edition of Miscellaneous Publication M126. Pages 1 to 3 give interconversion tables from $^{\circ}\text{C}$ to $^{\circ}\text{F}$ and $^{\circ}\text{F}$ to $^{\circ}\text{C}$. Page 4 gives a list of the chemical elements, their melting points, and their atomic numbers and weights. April 10, 1947. 4 p. 5c.

M184. U. S. patents on powder metallurgy. . . Raymond E. Jager and Rolla E. Pollard

A total of 2,253 U. S. Patents pertaining to powder metallurgy are classified under four main headings: (A) Production, (B) Handling and Working, (C) Alloying, and (D) Applications. Under these main headings, the patents are listed by number in chronological order, together with the name of the inventor and a short abstract of the patent. Patents issued up to January 1, 1947, are included. July 1, 1947. 139 p. 30c.

M185. Rubber research and technology at the National Bureau of Standards.

Lawrence A. Wood

The paper consists of a summary of the activities of the National Bureau of Standards relating to natural rubber, synthetic rubbers, and related materials. It gives a brief outline of the work carried out in each of 13 different fields of investigation, and concludes with a bibliography of 174 publications by members of the staff of the National Bureau of Standards. May 1, 1947. 22 p. 10c.

M186. Report of the thirty-second National Conference on Weights and Measures.

A report of the proceedings of the thirty-second National Conference on Weights and Measures, held in Washington, D. C., September 26, 27, and 28, 1946, and attended by state, county, and city weights and measures officials. 126 p. 40c.

M187. Directory of commercial and college laboratories. Anne E. Rapuzzi

A list is given of commercial testing laboratories throughout the country with indications of the types of commodities which they are willing to test and the kinds of tests made. Special care has been exercised to make this list complete. There is also presented a list of laboratories in colleges which are used not only for purposes of instruction, but also to a considerable extent for testing and research work. Information concerning both the commercial laboratories and the colleges is arranged geographically for ready reference purposes. (Supersedes M171.) Aug. 30, 1947. 65 p. 30c.

SIMPLIFIED PRACTICE RECOMMENDATIONS

"Simplified Practice," in this series, means reduction of excessive variety of manufactured products, or of methods. Simplified Practice Recommendations are records of stock items retained after superfluous variety has been eliminated. These recommendations are developed by voluntary cooperation among manufacturers, distributors, consumers, and others interested, through a regular procedure of the National Bureau of Standards established for that purpose — a procedure designed to insure not only the initial success of a program, but also its continued adjustment to meet changing industrial conditions.

Each printed booklet contains not only the specific recommendation itself, but also its history and development, the names of trade associations, firms, individuals, and others that approved the recommendation, and the personnel of the standing committee in charge of its maintenance and revisions as needed to keep them current with developments. The status of any recommendation at any time may be determined by writing to the Division of Commodity Standards, National Bureau of Standards, Washington 25, D. C. The date from which each recommendation is effective is given.

- R1. Vitrified paving brick. August 15, 1940. 5c.
- R2. Bedsteads, springs and mattresses. November 1, 1932. 5c.
- R3. Metal lath (expanded and sheet) and metal plastering accessories. April 11, 1944. 5c.
- R4. Asphalt. June 15, 1936. 5c.
- R5. Hotel chinaware. January 1, 1924. 5c.
- R6. Files and rasps (American pattern, and curved-tooth milled files). September 15, 1947. 10c.
- R7. Face brick and common brick. June 21, 1923.
- R8. Ferrous range boilers, expansion tanks, and solar tanks. September 1, 1947. 5c.
- R9. Woven-wire fencing; woven-wire fence packages. March 1, 1947. 10c.
- R10. Milk and cream bottles (capacities, weights, dimensions, and finishes). December 31, 1947. 10c.
- R11. Bed blanket sizes. September 15, 1936.
- R12. Hollow building tile. March 1, 1926.
- R13. Structural slate. February 1, 1928.
- R14. Roofing slate. February 1, 1928.
- R15. Blackboard slate. November 1, 1935. 5c.
- R16. Lumber — American lumber standards for softwood lumber. October 15, 1939. 20c.
- R17. Heavy forged hand tools. October 15, 1947. 10c.
- R18. Builders' hardware (nontemplate). (Standards for builders' hardware are set forth in Commercial Standard CS22-40).
- R19. Asbestos paper and asbestos millboard. December 15, 1937. 5c.
- R20. Steel barrels and drums. January 1, 1928.
- R21. Lavatory and sink traps. December 31, 1946. 5c.
- R22. Paper (basic sheet sizes). December 31, 1940. 5c.
- R23. Plow bolts. January 1, 1945. 5c.
- R24. Hospital beds. December 1, 1937. 5c.
- R25. Hot water storage tanks. January 1, 1925.
- R26. Steel reinforcing bars. June 15, 1942. 5c.
- R27. Cotton duck. November 1, 1936. 5c.
- R28. Sheet steel. January 1, 1929.
- R29. Eaves trough, conductor pipe, and fittings and ridge rolls. February 1, 1942. 5c.
- R30. Roofing ternes. January 1, 1942. 5c.
- R31. Loaded paper shot shells. January 2, 1948. 10c.
- R32. Concrete building units. August 1, 1938.
- R33. Cafeteria and restaurant chinaware. January 1, 1925.
- R34. Warehouse forms. September 24, 1924. 10c.
- R35. Steel lockers (single, double, and multiple tier). September 16, 1944. 5c.

- R36. Milling cutters. March 15, 1934.
- R37. Commercial forms (invoice, purchase order and inquiry.) Feb. 16, 1927.
(Reissued in August 1938). 10c.
- R38. Sand-lime brick. June 15, 1937. 5c.
- R39. Dining-car chinaware. July 1, 1925. 5c.
- R40. Hospital chinaware. July 1, 1925. 5c.
- R41. Agricultural insecticide and fungicide (package sizes). November 1, 1942. 5c.
- R42. Grocers' paper bags. March 1, 1943. 5c.
- R43. Paint and varnish brushes. December 15, 1927. 5c.
- R44. Box board thicknesses. December 31, 1936. 5c.
- R45. Grinding wheels. July 1, 1947. 15c.
- R46. Tissue paper. June 15, 1939. 5c.
- R47. Cut tacks and small cut nails. July 1, 1928. 10c.
- R48. Shovels, spades, scoops, and telegraph spoons. September 1, 1942. 5c.
- R49. Sidewalk, floor and roof lights. March 1, 1926. 5c.
- R50. Bank checks, notes, drafts, and similar instruments. March 1, 1926.
- R51. Chasers for self-opening and adjustable die heads. July 1, 1929. 10c.
- R52. Staple vitreous china plumbing fixtures. September 30, 1936. (Included in Commercial Standard CS20-42).
- R53. Steel reinforcing spirals. December 15, 1932. 5c.
- R54. Sterling silver flatware. January 1, 1926.
- R55. Tinware, galvanized and japanned ware. July 1, 1926.
- R56. Carbon brushes (carbon, graphite, and metal-graphite) and brush shunts.
June 15, 1936. 5c.
- R57. Wrought-iron and wrought-steel pipe, valves, and fittings. October 1, 1932.
5c.
- R58. Classification of iron and steel scrap. June 15, 1936. 5c.
- R59. Rotary-cut lumber stock for wire-bound boxes. November 1, 1926. 5c.
- R60. Packaging of carriage, machine, and lag bolts. November 15, 1943. 5c.
- R61. Clay tiles for floors and walls. September 1, 1944. 10c.
- R62. Metallic cartridges. January 2, 1948. 10c.
- R63. Metal spools (for annealing, handling, and shipping wire). January 1, 1928.
5c.
- R64. One-pound folding boxes for coffee. July 1, 1930. 5c.
- R65. Packaging of overhead electric railway material. October 1, 1931. 5c.
- R66. Automobile brake lining. December 1, 1927. 5c.
- R67. Taper roller bearings. January 1, 1936.
- R68. Metal and nonconducting flashlight cases. June 1, 1941. 5c.
- R69. Packaging of razor blades. July 1, 1928. 5c.
- R70. Salt packages. September 1, 1946. 5c.
- R71. Turnbuckles. January 1, 1928. 5c.
- R72. Solid section steel windows. September 1, 1927.
- R73. One-piece porcelain insulators. October 1, 1927. 5c.
- R74. Hospital and institutional cotton textiles. July 1, 1930. 5c.
- R75. Composition blackboard. April 1, 1929. 5c.
- R76. Ash handles. August 1, 1940. 5c.
- R77. Hickory handles. November 1, 1945. 5c.
- R78. Iron and steel roofing. June 1, 1928. 5c.
- R79. Malleable foundry refractories. February 1, 1928. 10c.
- R80. Folding and portable wooden chairs. March 15, 1928. 5c.
- R81. Binders' board. March 1, 1928. 5c.
- R82. Hollow metal single acting swing doors, frames and trim. August 1, 1928.
- R83. Kalamein doors. April 1, 1928.
- R84. Composition books. September 1, 1928. 5c.
- R85. Adhesive plaster. October 1, 1947. 5c.
- R86. Surgical gauze. June 1, 1947. 5c.
- R87. Forms for concrete joist construction floors. May 1, 1932. 5c.
- R88. Floor sweeps. June 1, 1937. 5c.
- R89. Coated abrasive products. May 15, 1946. 10c.
- R90. Hack-saw blades. January 15, 1946. 10c.
- R91. Glass containers for preserves, jellies and apple butter. December 15, 1932.
- R92. Hard fiber twine and lath yarn (ply and yarn goods). April 1, 1938.
- R93. Paper shipping tags. March 1, 1939. 5c.
- R94. Open-web steel joists. October 1, 1930. 5c.
- R95. Skid platforms. October 1, 1930. 5c.
- R96. Ice cake sizes. October 1, 1928. 5c.
- R97. Bell-bottom screw jacks. June 1, 1947. 5c.
- R98. Photographic paper. August 1, 1943. 5c.

- R99. Pocket knives. January 1, 1930. 10c.
- R100. Welded chain. January 2, 1947. 10c.
- R101. Metal partitions for toilets and showers. December 1, 1940. 5c.
- R102. Granite curbstone. January 15, 1933. 5c.
- R103. Industrial truck and trailer solid tires. June 1, 1934. 5c.
- R104. Packaging of flashlight batteries. July 1, 1930. 5c.
- R105. Wheelbarrows. April 1, 1932. 5c.
- R106. Hospital plumbing fixtures. July 1, 1941. 5c.
- R107. Glassine bags. October 15, 1931. 5c.
- R108. Dental hypodermic needles. June 15, 1944. 5c.
- R109. Refrigerator ice compartments. October 1, 1929.
- R110. Soft fiber (jute) twine. November 1, 1929. 10c.
- R111. Color for school furniture. January 2, 1930.
- R112. Elastic shoe goring. November 1, 1929. 5c.
- R113. Restaurant guest checks. February 2, 1930. 5c.
- R114. No. 1 Kraft paper sealing tape. February 1, 1930. 10c.
- R115. Full disk buffing wheels. February 2, 1930. 5c.
- R116. Dental brush wheels. February 1, 1931. 10c.
- R117. Packaging of dental plaster, investment and artificial stone. November 1, 1930. 5c.
- R118. Abrasive grain sizes. April 1, 1945. 5c.
- R119. Fast selvaige terry towels. March 1, 1931. 5c.
- R120. Ice-cream brick molds and cartons. June 30, 1940. 5c.
- R121. Calcimine brushes (block sizes). March 2, 1931. 5c.
- R122. Wire insect screen cloth. November 1, 1931.
- R123. Carbonated beverage bottles. May 1, 1943. 5c.
- R124. Polished cotton twine. November 1, 1931. 5c.
- R125. Waxed tissue paper. November 1, 1931. 5c.
- R126. Set-up paper boxes (used by department and specialty stores). January 1, 1941. 5c.
- R127. Folding paper boxes (used by department and specialty stores). January 1, 1941. 5c.
- R128. Corrugated paper boxes (used by department and specialty stores). January 1, 1941. 5c.
- R129. Notion and millinery paper bags (used by department and specialty stores). January 1, 1941. 5c.
- R130. Dental lathe grinding wheels. January 1, 1932. 5c.
- R131. Glass containers for mayonnaise and kindred products. January 1, 1935. 5c.
- R132. Ice cream cups and cup caps. July 1, 1936. 5c.
- R133. Surgical dressings. July 1, 1947. 10c.
- R134. Singletrees, doubletrees and neckyokes. April 1, 1932. 5c.
- R135. Wooden butter tubs. January 1, 1932. 5c.
- R136. Flax and hemp twine. June 15, 1932. 5c.
- R137. Dental cone-socket mirrors. September 1, 1932. 5c.
- R138. Dental rubber (base and veneering). September 1, 1932. 5c.
- R139. Commercial laundry extractors. October 1, 1932. 5c.
- R140. Commercial laundry flat-work ironers. October 1, 1932. 5c.
- R141. Commercial laundry tumblers. October 1, 1932. 5c.
- R142. Commercial laundry washers. October 1, 1932. 5c.
- R143. Paper cones and tubes (for textile winding). October 15, 1939. 5c.
- R144. Paints, varnishes, and related products (colors and containers). November 1, 1945. 5c.
- R145. Packaging of electric railway motor and controller parts. March 15, 1933. 5c.
- R146. Corrugated and solid fiber boxes for canned fruits and vegetables. December 1, 1941. 5c.
- R147. Wire diameters for mineral aggregate production screens. June 30, 1942. 5c.
- R148. Glass containers for cottage cheese and sour cream (capacities, weights, dimensions, and finish). December 31, 1947. 10c.
- R149. Sieve (screen) sizes of canned peas. May 1, 1933. 5c.
- R150. Copper wire nails. July 1, 1934. 5c.
- R151. To be assigned.
- R152. Basic dimensions for cones for warp and knitting yarns and hole sizes for bobbins for filling cop winders. March 1, 1934. 5c.
- R153. Hole sizes for taper tubes for filling cop winders. March 1, 1934. 5c.
- R154. Cupola refractories. October 1, 1938. 10c.
- R155. Cans for fruits and vegetables (names, dimensions, capacities, and designated use). September 1, 1940.
- R156. Extracted-honey packages. June 1, 1941. 5c.

- R157. Steel horizontal firebox heating boilers. January 1, 1937. 5c.
- R158. Forged axes. November 17, 1942. 5c.
- R159. Forged light hammers. November 17, 1942. 5c.
- R160. Forged hatchets. November 17, 1942. 5c.
- R161. Packaging of automotive (bus) engine parts. September 1, 1935.
- R162. Packaging of air brake (electric railway) parts. September 1, 1935. 5c.
- R163. Coarse aggregates (crushed stone, gravel and slag). May 25, 1939.
- R164. Tinned-steel ice cream cans. July 1, 1936. 5c.
- R165. Photographic film for miniature copies of records. August 1, 1936.
- R166. Color code for marking steel bars. April 1, 1937. 5c.
- R167. Counter, window and radiator brushes. June 1, 1937. 5c.
- R168. Braided shoe laces. June 15, 1937. 5c.
- R169. Bolts and nuts (stock-production sizes). October 1, 1945. 10c.
- R170. Spice containers (tin and fiber). June 15, 1938. 5c.
- R171. Wooden boxes for canned fruit and vegetables. July 1, 1938. 5c.
- R172. Stock folding boxes for garments and dry cleaning. September 1, 1938. 5c.
- R173. Stock folding boxes for millinery. September 1, 1938. 5c.
- R174. Cast-iron radiators. January 1, 1947. 5c.
- R175. Heavy-duty, round, nesting, paper, food and beverage containers and lids. September 15, 1940. 5c.
- R176. Color marking for anesthetic gas cylinders. January 29, 1941. 5c.
- R177. Single-faced corrugated-board rolls (used by department and specialty stores). January 1, 1941. 5c.
- R178. Packaging of first-aid unit dressings and treatments. June 30, 1941. 5c.
- R179. Structural insulating board (vegetable fiber). December 15, 1946. 5c.
- R180. Copper conductors for building purposes. July 1, 1941. 5c.
- R181. Non-ferrous range boilers. July 1, 1941. 5c.
- R182. Food service equipment. October 1, 1941. 5c.
- R183. Brass or bronze valves (gate, globe, angle, and check). September 1, 1946. 5c.
- R184. Iron valves (gate, globe, angle, and check). March 1, 1947. 5c.
- R185. Pipe fittings (gray cast iron, malleable iron, and brass or bronze). September 1, 1947. 10c.
- R186. Cotton canton flannels for work gloves. November 1, 1944. 5c.
- R187. Food trays, or dishes (waxed paper, molded wood pulp, and wood types). April 1, 1942. 5c.
- R188. Spring and slotted clothepins (sizes and packaging). April 1, 1942. 5c.
- R189. Round and flat hardwood toothpicks (packaging and sizes). April 1, 1942.
- R190. Stove pipe and accessories. August 1, 1942. 5c.
- R191. School tables. January 1, 1943. 5c.
- R192. Crayons, chalks, and related art materials for school use (types, sizes, packaging, and colors). May 1, 1945. 5c.
- R193. Packages for shortening, salad oil, and cooking oil. July 1, 1942. 5c.
- R194. Cotton jersey cloth and tubing for work gloves. June 1, 1942. 5c.
- R195. Dental excavating burs. September 1, 1946. 5c.
- R196. Glass containers for green olives (capacities, dimensions, and packaging). November 1, 1942. 5c.
- R197. Glass containers for maraschino cherries (capacities, dimensions, and packaging). November 1, 1946. 5c.
- R198. Wire rope. February 15, 1943. 10c.
- R199. Cloth window shades. March 1, 1943. 5c.
- R200. Paper boxes for toiletries and cosmetics. July 1, 1943. 5c.
- R201. Iron and steel pop safety valves. September 15, 1943. 5c.
- R202. Air compressors for automotive service stations and garages (motor driven, $\frac{1}{2}$ to 10 horsepower). December 1, 1943. 5c.
- R203. Containers and packages for household insecticides (liquid spray type). January 1, 1944. 5c.
- R204. Bronze pop safety valves, and bronze, iron, and steel relief valves. February 1, 1944. 5c.
- R205. Iron and steel relief valves for petroleum, chemical, and general industrial services. October 1, 1944. 5c.
- R206. Swiss pattern files. October 6, 1944. 5c.
- R207. Pipes, ducts, and fittings for warm-air heating and air conditioning. March 1, 1945. 10c.
- R208. Fluid milk cans. August 1, 1946. 5c.
- R209. Peanut butter packages and containers. June 1, 1945. 5c.
- R210. Carbon-brush terminals (electric). July 15, 1945. 5c.

- R211. Clay sewer pipe and fittings. May 31, 1945. 10c.
R212. Cast-brass solder-joint fittings. July 1, 1945. 5c.
R213. Asphalt roll roofing and asphalt- and tar-saturated-felt products. November 15, 1945. 5c.
R214. Metal-cutting band saws (hard edge, flexible back), December 17, 1945. 5c.
R215. Luggage. January 1, 1946. 5c.
R216. Hot-rolled carbon steel structural shapes. February 15, 1946. 10c.
R217. Copper water tube and copper and brass pipe. March 15, 1946. 5c.
R218. Paper tubes for packaging milk-bottle caps. March 1, 1946. 5c.
R219. Automatic regulating valves. April 1, 1946. 5c.
R220. Open-end and box wrenches. April 15, 1946. 5c.
R221. Steel rivets (stock production sizes). June 1, 1946. 5c.
R222. Hot-rolled carbon steel bars and bar-size shapes (produced from billets or blooms). June 30, 1946. 10c.
R223. Wire nails and staples. March 1, 1947. 10c.
R224. Medical and surgical hypodermic needles (for hospital use). January 1, 1947. 5c.
R225. Asphalt tile. March 1, 1947. 5c.

COMMERCIAL STANDARDS

Commercial standards are voluntary, recorded standards agreed upon by producers, distributors, and consumers, covering terminology, types, classifications, grades, sizes, and use characteristics of manufactured products as a basis for better understanding between buyers and sellers. They generally include standard methods of test, rating, certification, and labeling, and provide a uniform basis for fair competition. Each standard includes a list of members of the standing committee, a history of the project, a list of acceptors, and, except for recent issues, a list of other commercial standards.

The first date at the end of the abstract is the date the standard became effective; the second date, where given, is the date designated for clearance of nonstandard items from existing stocks.

Where prices are omitted, the standard may, in general, be consulted at the leading technical and public libraries, or be obtained in mimeographed form from the National Bureau of Standards.

- CS0. Commercial Standards and their value to business. Free from Bureau.
- CS1. Clinical thermometers (3d ed.) Feb. 20, 1942. 10c.
- CS2. Mopsticks. Oct. 15, 1930. 5c.
- CS3. Stoddard solvent (dry cleaning). (3d ed.) June 20, 1940. 10c.
- CS4. Staple porcelain (all-clay) plumbing fixtures. Jan. 1, 1930.
- CS5. Pipe nipples; brass, copper, steel, and wrought iron. Feb. 15, 1946. 5c.
- CS6. Wrought-iron pipe nipples. (Superseded by CS5).
- CS7. Standard weight malleable iron or steel screwed unions. May 1, 1930.
- CS8. Gage blanks (3d ed.) Jan. 1, 1942. 20c.
- CS9. Builders' template hardware (2d ed.) Jan. 1, 1933. 10c.
- CS10. Brass pipe nipples. (Superseded by CS5).
- CS11. Moisture regains of cotton yarns (2d ed.) Aug. 1, 1941. 5c.
- CS12. Fuel oils. (5th ed.) Jan. 5, 1940. 5c.
- CS13. Dress patterns (4th ed.) Oct. 20, 1944. 5c.
- CS14. Boys' button-on waists, shirts, junior and sport shirts. (3d ed.). Aug. 20, 1943. 5c.
- CS15. Men's pajama sizes — woven fabrics. (4th ed.). July 20, 1946. 5c.
- CS16. Wall paper. Oct. 19, 1929.
- CS17. Diamond core drill fittings. (3d ed.) July 1, 1947. 10c.
- CS18. Hickory golf shafts. Nov. 1, 1929. 10c.
- CS19. Foundry patterns of wood (2d ed.) Feb. 10, 1930.
- CS20. Staple vitreous china plumbing fixtures (3d ed.) July 10, 1942. 10c.
- CS21. Interchangeable ground-glass joints, stopcocks, and stoppers. (4th ed.) Feb. 15, 1939.
- CS22. Builder's hardware (nontemplate) (2d ed.) July 1, 1940. 10c.
- CS23. Feldspar. Sept. 1, 1930.
- CS24. Screw threads and tap-drill sizes. (Revision and consolidation of CS24-30 and CS25-30). Feb. 10, 1943. 15c.
- CS25. American national special screw threads. (Superseded by CS24).
- CS26. Aromatic red cedar closet lining. Oct. 1, 1930.
- CS27. Mirrors (2d ed.) Aug. 20, 1936.
- CS28. Cotton fabric tents, tarpaulins, and covers. (2d ed.) April 15, 1946. 5c.
- CS29. Staple seats for water-closet bowls. Oct. 1, 1931.
- CS30. Colors for sanitary ware. July 1, 1931.
- CS31. Wood shingles (4th ed.) Oct. 1, 1938. 5c.
- CS32. Cotton cloth for rubber and pyroxylin coating. June 15, 1931. 5c.
- CS33. Knit underwear (exclusive of rayon). July 30, 1943. 20c.
- CS34. Bag, case, and strap leather. Aug. 1, 1931. 5c.
- CS35. Hardwood plywood. Feb. 20, 1947. 10c.
- CS36. Fourdrinier wire cloth. (2d ed.) March 15, 1933.
- CS37. Steel bone plates and screws. Nov. 16, 1931. 10c.
- CS38. Hospital rubber sheeting. June 1, 1932.
- CS39. Wool and part-wool blankets. (2d ed.) May 27, 1937.
- CS40. Surgeons' rubber gloves. July 6, 1932. 5c.
- CS41. Surgeons' latex gloves. July 6, 1932. 5c.
- CS42. Fiber insulating board. (3d ed.) Aug. 25, 1943. 5c.

- CS43. Grading of sulphonated (sulphated) oils. Saponifiable types. Sept. 1, 1932.
- CS44. Apple wraps. Dec. 1, 1932. 5c.
- CS45. Douglas fir plywood. Sept. 15, 1947. 10c.
- CS45E. Douglas fir plywood (export grades). Nov. 1, 1936. 5c.
- CS46. Hosiery lengths and sizes. (3d ed.) Aug. 15, 1940. 10c.
- CS47. Marking of gold-filled and rolled-gold-plate articles other than watch cases. July 1, 1934. 5c.
- CS48. Domestic burners for Pennsylvania anthracite (underfeed type). (2d ed.) Nov. 30, 1940. 5c.
- CS49. Chip board, laminated chip board, and miscellaneous boards for book-binding purposes. Dec. 15, 1934. 5c.
- CS50. Binders board for bookbinding and other purposes. Oct. 1, 1934. 5c.
- CS51. Marking articles made of silver in combination with gold. July 1, 1936. 5c.
- CS52. 100-percent mohair plain velvet, 100-percent mohair plain frieze, and 50-percent mohair plain frieze. July 8, 1935. 5c.
- CS53. Colors and finishes for cast stone. Aug. 30, 1935. 5c.
- CS54. Mattresses for hospitals. Sept. 6, 1935. 5c.
- CS55. Mattresses for institutions. Sept. 6, 1935. 5c.
- CS56. Oak flooring (2d ed.) Feb. 1, 1941. 5c.
- CS56E. Oak flooring (exports). Feb. 5, 1941. 5c.
- CS57. Book cloths, buckrams, and impregnated fabrics for bookbinding purposes except library bindings. (2d ed.) June 20, 1940. 5c.
- CS58. Woven elastic fabrics for use in overalls (overall elastic webbing). May 15 1936. 5c.
- CS59. Textiles — testing and reporting (4th ed.) Feb. 20, 1944. 15c.
- CS60. Hardwood dimension lumber. Oct. 1, 1936. 10c.
- CS60E. Hardwood dimension lumber (exports). July 1, 1941. 5c.
- CS61. Wood-slat venetian blinds. Sept. 1, 1937. 5c.
- CS62. Colors for kitchen accessories. Jan. 1, 1938. 5c.
- CS63. Colors for bathroom accessories. Jan. 1, 1938. 5c.
- CS64. Walnut veneers. Dec. 15, 1937. 5c.
- CS65. Methods of analysis and of reporting fiber composition of textile products. (2d ed.) Feb. 20, 1943. 5c.
- CS66. Marking of articles made wholly or in part of platinum. June 20, 1939. 5c.
- CS67. Marking articles made of karat gold. Nov. 25, 1939. 5c.
- CS68. Liquid hypochlorite disinfectant, deodorant and germicide. June 10, 1938. 5c.
- CS69. Pine oil disinfectant. June 10, 1938. 5c.
- CS70. Phenolic disinfectant (emulsifying type). (2d ed.) Feb. 1, 1941. 5c.
- CS71. Phenolic disinfectant (soluble type). (2d ed.) Feb. 1, 1941. 5c.
- CS72. Household insecticide (liquid spray type). June 10, 1938.
- CS73. Old growth Douglas fir standard stock doors. (3d ed.) Sept. 20, 1945. 10c.
- CS74. Solid hardwood wall paneling. May 20, 1939. 5c.
- CS75. Automatic mechanical draft oil burners designed for domestic installations. (2d ed.) July 20, 1942. 10c.
- CS76. Hardwood interior trim and molding. Oct. 25, 1939. 5c.
- CS77. Sanitary cast-iron enameled ware. May 25, 1940. 5c.
- CS78. Ground-and-polished lenses for sun glasses. Oct. 10, 1939. 5c.
- CS79. Blown, drawn, and dropped lenses for sun glasses. Oct. 10, 1939. 5c.
- CS80. Electric direction signal systems for vehicles (after market). Jan. 1, 1941. 5c.
- CS81. Adverse-weather lamps for vehicles (after market). Jan. 1, 1941. 5c.
- CS82. Inner-controlled spotlamps for vehicles (after market). Jan. 1, 1941. 5c.
- CS83. Clearance, marker, and identification lamps for vehicles (after market). Jan. 1, 1941. 5c.
- CS84. Electric tail lamps for vehicles (after market). Jan. 1, 1941. 5c.
- CS85. Electric license-plate lamps for vehicles (after market). Jan. 1, 1941. 5c.
- CS86. Electric stop lamps for vehicles (after market). Jan. 1, 1941. 5c.
- CS87. Red electric warning lanterns. Jan. 1, 1941. 5c.
- CS88. Liquid-burning flares. Jan. 1, 1941. 5c.
- CS89. Hardwood stair treads and risers. Oct. 10, 1940. 5c.
- CS90E. Crawler mounted, revolving power shovels, lifting cranes, dragline and clamshell excavators (export classifications). Feb. 15, 1947. 15c.
- CS91. Factory-fitted Douglas fir entrance doors. Feb. 10, 1941. 5c.
- CS92. Cedar, cypress, and redwood tank stock lumber. Apr. 15, 1941. 5c.
- CS93. Portable electric drills (exclusive of high frequency). Oct. 18, 1941. 5c.
- CS94. Calking lead. June 25, 1941. 5c.
- CS95. Lead pipe. June 25, 1941. 5c.

- CS96. Lead traps and bends. June 25, 1941. 5c.
- CS97. Electric supplementary driving and passing lamps for vehicles (after market). Jan. 8, 1942. 5c.
- CS98. Artists' oil paint. May 10, 1942. 5c.
- CS99. Gas floor furnaces (gravity circulating type). May 25, 1942. 5c.
- CS100. Porcelain-enameled steel utensils. (2d ed.) Oct. 25, 1944. 10c.
- CS101. Flue-connected oil-burning space heaters equipped with vaporizing pot-type burners. Jan. 1, 1943. 10c.
- CS102E. Diesel and fuel-oil engines (export classifications). Oct. 30, 1942. 10c.
- CS103. Cotton and rayon velour (jacquard and plain). Nov. 10, 1942. 5c.
- CS104. Warm-air furnaces equipped with vaporizing pot-type oil burners. Oct. 1, 1946. 15c.
- CS105. Mineral wool; loose, granulated, or felted form, in low-temperature installations. March 1, 1943. 5c.
- CS106. Boys pajama sizes (woven fabrics). Dec. 9, 1944. 5c.
- CS107. Commercial electric-refrigeration condensing units.
- CS108. Treading automobile and truck tires. June 10, 1943. 10c.
- CS109. Solid-fuel-burning forced-air furnaces. May 10, 1944. 10c.
- CS110. Tire repairs, vulcanized (passenger, truck and bus tires). Aug. 20, 1943. 5c.
- CS111. Earthenware (vitreous glazed) plumbing fixtures. Oct. 15, 1943. 5c.
- CS112. Homogenous fiber wallboard. Oct. 25, 1943. 5c.
- CS113. Oil-burning floor furnaces equipped with vaporizing pot-type burners. Feb. 17, 1944. 10c.
- CS114. Hospital sheeting for mattress protection. Dec. 1, 1943. 5c.
- CS116. Bituminized-fibre drain and sewer pipe. March 10, 1944. 5c.
- CS117. Mineral wool: Blankets, blocks, insulating cement, and pipe insulation for heated industrial equipment. May 25, 1944. 10c.
- CS118. Marking of jewelry and novelties of silver. Aug. 15, 1944. 5c.
- CS(E)119. Dial indicators (for linear measurements). Jan. 1, 1945. 5c.
- CS120. Standard stock ponderosa pine doors. Oct. 1, 1946. 10c.
- CS121. Women's slip sizes (woven fabrics). April 20, 1945. 5c.
- CS122. Western hemlock plywood. March 5, 1945. 5c.
- CS123. Grading of diamond powder. May 5, 1945. 5c.
- CS(E)124. Master disks. Sept. 15, 1945. 5c.
- CS125. Prefabricated homes. Nov. 25, 1947. 10c.
- CS126. Tank mounted air compressors. Dec. 5, 1945. 10c.
- CS127. Self-contained mechanically refrigerated drinking water coolers. Effective six months after official announcement of cessation of hostilities. 10c.
- CS128. Men's sport shirt sizes — woven fabrics. (Other than those marked with regular neckband sizes). Sept. 20, 1945. 5c.
- CS129. Materials for safety wearing apparel. May 6, 1946. 5c.
- CS130. Color materials for art education in schools. Jan. 1, 1946. 10c.
- CS131. Industrial mineral wool products, all types — testing and reporting. March 15, 1946. 10c.
- CS132. Hardware cloth. April 15, 1946. 5c.
- CS133. Woven-wire netting. June 1, 1946. 5c.
- CS134. Cast aluminum cooking utensils (metal composition). July 20, 1946. 5c.
- CS135. Men's shirt sizes (exclusive of work shirts). July 15, 1946. 5c.
- CS136. Blankets for hospitals (wool, and wool and cotton). Aug. 30, 1946. 5c.
- CS137. Size measurements for men's and boys' shorts — woven fabrics. Dec. 30, 1946. 5c.
- CS138. Insect wire screening. Jan. 2, 1947. 5c.
- CS139. Work gloves. March 6, 1947. 10c.
- CS140. Testing and rating convectors. March 1, 1948. 10c.
- CS141. Sine bars, blocks, plates, and fixtures. Aug. 15, 1947. 5c.

CS5. Pipe nipples; brass, copper, steel and wrought-iron.

Covers the detail sizes and dimensions for brass, copper, steel, ferrous-alloy, and wrought-iron pipe nipples; reference to the appropriate Federal and ASTM Specifications controlling the quality of the pipe from which they are made and the threads; chamfering; tolerance on length; standard assortments of lengths for cartons of each size; and a recommended system of labeling to distinguish pipe nipples made according to these standards from those made from crop ends or used pipe. The pamphlet also contains a history of the project, list of acceptors, and the membership of the Standing Committee which is to consider all future revisions prior to circulation for written acceptance. February 15, 1946 (for new production). 5c.

CS13. Dress patterns.

Gives the standard classifications and corresponding body measurements set up by the dress pattern industry as a voluntary basis for dress pattern sizes. It includes for the purposes of this standard a definition of "body measurements." It also gives recommended standard widths of material for pattern layouts. Oct. 20, 1944 (for new production). 5c.

CS14. Boys' button-on waists, shirts, junior and sport shirts.

Gives size designations, methods of measuring, and standard minimum measurements for boys' waists and shirts made of woven fabrics. It also includes a system of button spacing for boys' button-on waists, and a recommended label for use in guaranteeing full size. Aug. 20, 1943 (for new production). 5c.

CS15. Men's pajama sizes — woven fabrics.

Gives size designations, methods of measuring, and standard minimum measurements for men's pajamas, whether made from shrunk or unshrunk woven fabrics, together with a recommended label for guaranteeing conformity to the standard. Jul. 20, 1946 (for new production). 5c.

CS28. Cotton fabric tents, tarpaulins, and covers.

Provides for the marking of treated and untreated finished tents, tarpaulins, and covers, or the fabrics thereof, to show the weight of the fabric in the grey in ounces per square yard; the cut size and the finished size at time of completion of manufacture; the type of fabric; a statement to the effect that canvas products are subject to shrinkage due to variable climatic conditions; and definitions. It requires that no markings or sales descriptions be used to show the finished weight of the fabric which creates confusion in merchandizing. The pamphlet includes a basis and method for marking; the wording of a guarantee statement; nomenclature; definitions; conversion tables; history of the project; and the membership of the Standing Committee. April 15, 1946 (for new production). 5c.

CS33. Knit underwear (exclusive of rayon).

Gives standard methods of measuring and standard measurements set up by the underwear industry as a voluntary basis for the production and purchasing of knit underwear (exclusive of rayon). It also includes recommended box sizes, cone colors for single cotton yarns, and methods of washing. July 30, 1943 (for new production). 20c.

CS35. Hardwood plywood (3d ed.)

Provides minimum specifications for four standard types of hardwood plywood based on the water resistance and durability of the bond, in four standard grades. It covers tests, densities, standard thicknesses, widths and lengths, tolerances, workmanship, packing, inspection, grade-marking and certification, method of ordering, and nomenclature and definitions. Feb. 20, 1947 (for new production). 10c.

CS42. Structural fiber insulating board.

Provides minimum specifications for five classes of structural fiber insulating board known as building board, lath for plaster base, roof insulation board, interior board, and sheathing. It covers physical requirements and tests for thermal conductivity, strength, absorption, and expansion, and sets forth the standard commercial sizes, tolerances, and methods of packing and labeling. Aug. 25, 1943 (for new production). 5c.

CS59. Textiles — testing and reporting (4th ed.).

Records the standard methods of testing and reporting results of tests to determine breaking strength; bursting strength; colorfastness to chlorine, crocking, cleaning (dry and wet), atmospheric gases, laundering, light, perspiration, and pressing (dry and wet); shrinkage in laundering and cleaning; and yarn slippage. They are applicable to textiles composed entirely of cotton, linen, wool, silk or rayon and other synthetic fibers, or mixtures thereof. It also includes the wording of a certificate which may be used on laboratory reports to inform clients that the methods of test and the results thereof are reported in accordance with the requirements of the commercial standard. Feb. 20, 1944 (for testing and reporting). 15c.

CS73. Old growth Douglas fir standard stock doors. (3d ed.)

Provides minimum specifications for four grades of old growth Douglas fir stock doors, made in four thicknesses, $\frac{3}{4}$, $1\frac{1}{8}$, $1\frac{3}{8}$, and $1\frac{3}{4}$ in. It covers construction, dimensions, and grading tolerances for seventy-seven standard stock designs or layouts which include house, garage, and cupboard doors, as well as sidelights. General

requirements for material, workmanship, and construction are set forth, together with provisions for inspection and labeling. Sept. 20, 1945 (for new production). 10c.

CS90E. Power cranes and shovels, convertible full revolving type: crawler, truck and wheel mounted: including clamshell, dragline, lifting crane, hoe, pile driver and skimmer scoop operating equipment (export classifications). (2d ed.)

Covers standard nomenclature and definitions, requirements for stability, propulsion, steering controls, climb and capacity, engineering data to be furnished for purposes of comparison for each machine offered, and shovel sizes of convertible full revolving type crawler, truck and wheel mounted, power cranes and shovels including clamshell, dragline, lifting crane, hoe, pile driver and skimmer scoop for export from the United States of America. It also includes a uniform system of labeling and wording for certificates of compliance with the standard to be furnished with each machine. Feb. 15, 1947 (for new production). 15c.

CS98. Artists' oil paint.

Covers one grade of artists' oil paint and includes criteria of color, nomenclature, chemical composition, working qualities, light-fastness, and performance. Also covers methods of testing to demonstrate conformance with the standard, packaging, and certification of quality. May 10, 1942 (for new production). 5c.

CS99. Gas floor furnaces (gravity circulating type).

Includes definitions, appliance construction requirements, sizing, placement, general installation requirements, venting, and gas connections. It also covers guarantee, certification, and labeling of gravity circulating-type gas floor furnaces. May 25, 1942 (for new production). 5c.

CS100. Porcelain-enameled steel utensils. (2d ed.).

Provides performance requirements for porcelain-enameled steel utensils, both multiple-coated and single-coated, for cooking, household, food storage, and hospital use. The requirements include quality of base metal, appearance, thickness, enameling, resistance to boiling acid, thermal shock, and impact; capacity, methods of test, and labeling. Oct. 25, 1944 (for new production). 10c.

CS101. Flue-connected oil-burning space heaters equipped with vaporizing pot-type burners.

Covers definition, general requirements, design and construction, performance, laboratory test code, and publication of heater ratings. It also covers informative labeling and guarantees on oil-burning space heaters. Jan. 1, 1943 (for new production). 23 p. 10c.

CS102E. Diesel and fuel-oil engines (export classifications).

Covers nomenclature and definitions, ratings, rules for fuel- and lubricating-oil guarantees, standard equipment, lists of spare parts, engine and accessory data, certification, and manufacturers' recommendations on other necessary or desirable equipment for stationary, machine and portable Diesel and fuel-oil engines in export from the United States. Oct. 30, 1942 (for new production). 10c.

CS103. Cotton and rayon velour (jacquard and plain).

Records minimum requirements for width, weights of the pile and the finished fabric, number of pile tufts per square inch, ends of pile and picks per inch, pile coverage, colorfastness to light, anchorage of pile, and abrasion resistance of cotton and rayon velour (jacquard and plain) for upholstery purposes.

The standard also includes methods of test and the manner in which a group of manufacturers are to label their fabrics to inform the purchasers that the quality is in accordance with the requirements of the commercial standard. Nov. 10, 1942 (for new production). 5c.

CS104. Warm-air furnaces equipped with vaporizing pot-type oil burners.

Covers general requirements, furnace design and construction, performance, test codes for forced air and gravity furnaces, publication of furnace ratings, informative labeling, and guarantees. This standard does not include floor furnaces. Oct. 1, 1946 (for new production). 15c.

CS105. Mineral wool; loose, granulated, or felted form, in low-temperature installations.

Covers minimum physical and chemical requirements of loose, granulated, and felted mineral wool for use in insulating low-temperature areas. It includes thickness of insulation required for various operating temperatures, specifications for

auxiliary materials, tests, installation requirements, and method of guarantee compliance with the standard. March 1, 1943 (for new production). 5c.

CS106. Boys' pajama sizes (woven fabrics).

Gives size designations, methods of measuring, and standard minimum measurements for boys' and boys' junior pajamas, whether made from shrunk or unshrunk fabrics, together with a recommended label for use in guaranteeing conformity to the standard. Dec. 9, 1944 (for new production). 5c.

CS107. Commercial electric-refrigeration condensing units.

Covers requirements, rating, motor loading, and testing of air-cooled and water-cooled, belt-driven commercial electric-refrigeration condensing units, in $\frac{1}{2}$ - to 3-hp sizes, and water-cooled units of 5 hp, using methyl chloride, Freon 12, or SO_2 refrigerants. Covers all other applications, including air conditioning. Covers minimum requirements for controls, shutoff valves and receiver-tank capacities, and also a uniform method of guaranteeing compliance with the standard and installation and service pointers.

CS108. Treading automobile and truck tires.

Covers inspection of the tire to be treaded and the conditions necessary for satisfactory treading, condition of casing and quality of cement used, equipment, workmanship, and guarantee to the purchaser. June 10, 1943. 10c.

CS109. Solid-fuel-burning forced-air furnaces.

Covers surface-fired and magazine feed, solid-fuel-burning warm air furnaces with forced-air circulation in sizes up to 80,000 Btu output, when using chestnut size anthracite as a test fuel.

Sets forth general, construction, and performance requirements, methods of test, data and report sheet, and form of manufacturer's guarantee label. May 10, 1944 (for new production). 10c.

CS110. Tire repairs, vulcanized (passenger, truck, and bus tires).

Covers general requirements for the inspection of the injury to the tire; the minimum acceptable condition of the tire; the method of repair for maximum service; and the recommended wording of a uniform guarantee label. Aug. 20, 1943 (for new production). 5c.

CS111. Earthenware (vitreous glazed) plumbing fixtures.

Covers earthenware (vitreous-glazed) plumbing fixture items such as bath tubs, lavatories, kitchen sinks, laundry trays and similar products. The requirements cover properties of the material, methods of test, method of inspection, grading, definitions, and labeling of items which meet the standard. Oct. 15, 1943 (for new production). 5c.

CS112. Homogenous fiber wallboard.

Provides minimum specifications for one grade of homogenous fiber wallboard of a nominal thickness of $\frac{3}{8}$ inch, 4 feet wide, and from 6 to 12 feet long. It covers the physical requirements and tests for tensile and transverse strength, deflection, water absorption, and linear expansion, and sets forth the standard commercial sizes, tolerances, and methods of packing and labeling. Oct. 25, 1943 (for new production). 5c.

CS113. Oil-burning floor furnaces equipped with vaporizing pot-type burners.

Covers oil-fired, flue-connected floor furnaces equipped with vaporizing pot-type burners with or without mechanical draft or forced circulation, either manually or automatically controlled. It includes sections on definitions, general requirements, design and construction, performance, laboratory test code, publication of furnace ratings, informative labeling, guarantees, general installation requirements, sizing, placement, and venting. Feb. 17, 1944 (for new production). 10c.

CS114. Hospital sheeting for mattress protection.

Covers fabrics, coating material and workmanship; resistance to mineral oil and disinfectants; resistance to sterilization, accelerated aging and cracking; permeability to water; burning rate; thickness; breaking and tearing strengths; and methods of test. The wording of a guarantee statement by the manufacturer is included. Dec. 1, 1943 (for new production). 5c.

CS116. Bituminized-fibre drain and sewer pipe.

Covers uses, general requirements, dimensions, physical and chemical properties, and methods of testing of bituminized-fibre drain and sewer pipe (including 45° and

90° bends, straight couplings, and 5° angle couplings) in diameters ranging from 2 to 8 inches and in 5- and 8-foot lengths. It also establishes a uniform method of guaranteeing compliance with the standard. Mar. 10, 1944 (for new production). 5c.

CS117. Mineral wool: Blankets, blocks, insulating cement, and pipe insulation for heated industrial equipment.

Covers minimum physical requirements for mineral wool: Blankets, blocks, insulating cement, and pipe insulation for heated industrial equipment. It also covers standard sizes, tolerances, recommended insulation thickness for various operating temperatures, instructions on installation and method of guaranteeing compliance with the standard. May 25, 1944. 10c.

CS118. Marking of jewelry and novelties of silver.

Covers the marking of silver articles commonly or commercially known as jewelry or novelties (other than flatware, hollow ware and toilet ware) offered for sale in the United States.

Also sets forth definitions, quality marks, composition, exemptions, and certification labeling of sterling and coin silver jewelry. August 15, 1944 (for new production). 5c.

CS(E)119. Dial indicators (for linear measurements).

Covers the major essential requirements for precision dial indicators in the American Gage Design type in four groups of sizes, ranging from 1 $\frac{3}{8}$ in. to 3 $\frac{3}{4}$ in. bezel diameter, with four classes of dial markings in English measure, namely, 0.00005, 0.0001, 0.0005, and 0.001 in., and four classes of dial markings in metric measure, namely, 0.001, 0.002, 0.005, and 0.01 mm. Jan. 1, 1945 (for new production). 5c.

CS120. Standard stock ponderosa pine doors.

Provides minimum specifications for quality and construction of house, garage, cupboard, combination, summer, storm, and toilet doors, and sidelights made of ponderosa pine. Requirements for material, workmanship, sticking, sizes, and grading are set forth, together with illustrations and layouts for 120 different designs. The standard also covers tolerances, inspection, nomenclature and definitions and a method of certifying compliance. October 1, 1946 (for new production). 10c.

CS121. Women's slip sizes (woven fabrics).

Gives standard methods of measuring and standard minimum measurements set up by the women's slip industry on a voluntary basis for the production and purchasing of women's slips (made from woven fabrics). It also includes a recommended label for use in denoting conformity to the standard. April 20, 1945 (for new production). 5c.

CS122. Western hemlock plywood.

Includes general requirements as to workmanship, glueing, veneer thickness, loading, and packing, together with detail specifications for four grades of moisture-resistant-type Western hemlock plywood. There are also included tests for bondage, table of standard sizes, size tolerances, inspection and grade marking provisions, and nomenclature and definitions. March 5, 1945 (for new production). 5c.

CS123. Grading of diamond powder.

Covers grade designations, grain size and size range, amount of "fines" or particles smaller than the minimum for each designation, adulteration and impurities, methods of sampling and inspection, and method of guaranteeing compliance with this standard. May 5, 1945 (for new production). 5c.

CS(E)124. Master disks.

Covers the major essential material and dimensional requirements for master disks in the American Gage Design styles in sizes from above 0.105 in. to and including 8.010 in., as well as specifications for hardness, finish, accuracy tolerances in three classes, and methods of test. It also covers uniform methods of marking, identification, and labeling to guarantee compliance with the standard. Sept. 15, 1945 (for new production). 5c.

CS125. Prefabricated homes.

Provides minimum requirements for one, one and a half, and two story prefabricated homes. It covers structural strength of the various component parts, requirements for light and ventilation, and recommended requirements for foundations, chimneys, heating, plumbing, insulation, and electrical wiring. It includes general requirements for material, workmanship as provided by the manufacturer, erection

at site, and assembly of prefabricated units, and protection during transportation and erection. May 10, 1945 (for new production).

CS126. Tank mounted air compressors.

Covers ratings, motor loading, methods of testing single-stage and two-stage air compressors from $\frac{1}{4}$ horsepower to 10 horsepower, inclusive. It also includes informative labeling. Dec. 5, 1945 (for new production). 10c.

CS127. Self-contained mechanically refrigerated drinking water coolers.

Covers definitions, general requirements, methods of testing, method of rating, standard rating conditions, size designations, minimum and maximum capacities, and uniform guarantees of ratings of self-contained mechanically refrigerated drinking water coolers of the insulated storage and instantaneous types, air-cooled or water-cooled, and of certain other listed types and sizes. Effective six months after official announcement of cessation of hostilities. (For new production). 10c.

CS128. Men's sport shirt sizes — woven fabrics (other than those marked with regular neckband sizes).

Gives size designations, methods of measuring, and standard minimum measurements for men's sport shirts (other than those marked with regular neckband sizes), whether made from shrunk or unshrunk woven fabrics, together with a recommended label for guaranteeing conformity to the standard. Sept. 20, 1945 (for new production). 5c.

CS129. Materials for safety wearing apparel.

Covers asbestos fabrics, flame resistant cotton fabrics, leather, woolen fabrics and accessory materials used in the manufacture of safety wearing apparel. The standard also covers methods of test, and methods of labeling to certify or guarantee quality, together with a list of acceptors, history of the project, and a roster of the Standing Committee. May 6, 1946 (for new production). 5c.

CS130. Color materials for art education in schools.

Covers material and workmanship, working qualities, color, packing, methods of test, and quality guarantee for wax and pressed crayons, semi-moist and dry cake water colors, liquid and powder tempera, Type "A" and Type "B" white dustless blackboard crayons, sight saving and colored dustless crayons, molded sight saving, white and colored chalk crayons, lecturers' colored chalk and dustless crayons, pastel crayons, and modeling clay. January 1, 1946 (for new production). 10c.

CS131. Industrial mineral wool products, all types — testing and reporting.

Provides uniform methods for testing and reporting the physical and chemical properties of mineral wool products made of rock, slag, or glass and describes equipment required to produce standard results. Methods of test are included for adhesive strength; compressive strength; corrosion resistance; coverage; density; fire resistance; moisture adsorption; odor emission; shot content; temperature stability and thermal conductivity. It also includes the working of a certification which may be used on laboratory reports to inform clients that the method of test and the results thereof are reported in accordance with the requirements of the commercial standard. March 15, 1946 (for testing and reporting). 10c.

CS132. Hardware cloth.

Describes the nomenclature, definitions and general requirements for commercial standard hardware cloth designed and woven primarily for use for window guards, screen door guards, tree guards, industrial machinery guards, and other farm and industrial purposes. April 15, 1946 (for new production). 5c.

CS133. Woven-wire netting.

Describes the nomenclature, definitions, and general requirements for galvanized steel, woven wire netting designed for use for poultry runs and pens, domestic animal pens, fur-bearing animal pens, trap traps, and stucco reinforcement. June 1, 1946 (for new production). 5c.

CS134. Cast aluminum cooking utensils (metal composition).

Covers the composition of the metal and reference to methods of test therefor, of cast aluminum utensils designed and intended for use in the cooking of food. It also includes requirements for marking and labeling to indicate compliance with the standard. July 20, 1946 (for new production). 5c.

CS135. Men's shirt sizes (exclusive of work shirts).

Covers methods of measuring and standard minimum measurements for men's shirts (exclusive of work shirts), together with a recommended label for use in guaranteeing conformity to the standard. July 15, 1946 (for new production). 5c.

CS136. Blankets for hospitals (wool, and wool and cotton).

Covers minimum requirements for all wool, 75 percent wool (cotton warp, wool filling), and 50 percent wool (cotton warp, wool and cotton filling) blankets including for each type the size, weight per square yard, thickness, breaking strength, compressibility, colorfastness, shrinkage and launderability. It also includes methods of test and the recommended working by which manufacturers and distributors may guarantee compliance with the standard. August 30, 1946 (for new production). 5c.

CS137. Size measurements for men's and boys' shorts — woven fabrics.

Gives size designations, methods of measuring, and standard minimum measurements for men's and boys' shorts, together with a recommended label for guaranteeing conformity to the standard. Dec. 30, 1946 (for new production). 5c.

CS138. Insect wire screening.

Describes the nomenclature, definitions and general requirements for commercial standard insect wire screening, designed and woven primarily for installation in or on, any dwelling, building, or structure, for the purpose of preventing the ingress of flies, mosquitoes, or other insects. January 2, 1947 (for new production). 5c.

CS139. Work gloves.

Gives standard definitions, nomenclature, methods of measuring and standard minimum measurements for work gloves, and designates the type of work glove that may be manufactured to the best economic interest of all concerned. It also includes a recommended label for guaranteeing conformity to the standard. March 6, 1947. (for new production). 10c.

CS140. Testing and rating convectors.

Covers definitions, general provisions relative to tests, methods of testing and rating cast-iron and non-ferrous steam and hot water convectors, procedure in obtaining approval of ratings, and method of guaranteeing compliance with the standard. March 1, 1948 (for new production). 10c.

CS141. Sine bars, blocks, plates, and fixtures.

Covers the major essential material and dimensional requirements for sine bars, blocks, plates, and fixtures in all sizes, particularly 5 in., 10 in., and 20 in., and in two accuracy classifications, commercial and laboratory. It also covers definitions of sine bars, blocks, plates and fixtures, and specifications for hardness, finish, accuracy tolerances, and methods of test, as well as uniform methods of marking, identification, and labeling to guarantee compliance with the standard. August 15, 1947 (for new production). 5c.

BUILDING MATERIALS AND STRUCTURES REPORTS

This series reports the results of Bureau investigations of the properties and suitability of new materials and new methods of construction. The program was carried out with the cooperation and advice of the housing agencies of the Government. The objective was to furnish the Government, the building industry, and the public with technical information that would be useful with particular reference to low-cost housing.

- BMS1. Research on building materials and structures for use in low-cost housing. Hugh L. Dryden. June 16, 1938.
- BMS2. Methods of determining the structural properties of low-cost house constructions. Herbert L. Whittemore and Ambrose H. Stang. Aug. 10, 1938. 10c.
- BMS3. Suitability of fiber insulating lath as a plaster base. Lansing S. Wells and D. C. Smith. Aug. 23, 1938. 15c.
- BMS4. Accelerated aging of fiber building boards. Daniel A. Jessup, Samuel G. Weissberg, and Charles G. Weber. Oct. 11, 1938. 10c.
- BMS5. Structural properties of six masonry wall constructions. Herbert L. Whittemore, Ambrose H. Stang, and Douglas E. Parsons. Nov. 21, 1938. 15c.
- BMS6. Survey of roofing materials in the Southeastern States. Hubert R. Snoke and Leo J. Waldron. Nov. 4, 1938. 15c.
- BMS7. Water permeability of masonry walls. Cyrus C. Fishburn, David Watstein, and Douglas E. Parsons. Oct. 18, 1938. (Superseded by BMS82 and BMS95).
- BMS8. Methods of investigation of surface treatment for corrosion protection of steel. Rolla E. Pollard and Wilbur C. Porter. Oct. 11, 1938. 10c.
- BMS9. Structural properties of the Insulated Steel Construction Co.'s "Frameless-Steel" constructions for walls, partitions, floors, and roofs. Herbert L. Whittemore, Ambrose H. Stang, and Vincent B. Phelan. Oct. 28, 1938. 10c.
- BMS10. Structural properties of one of the "Keystone Beam Steel Floor" constructions sponsored by the H. H. Robertson Co. Herbert L. Whittemore, Ambrose H. Stang, and Cyrus C. Fishburn. Dec. 29, 1938. 10c.
- BMS11. Structural properties of the Curren Fabrihome Corporation's "Fabrihome" constructions for walls and partitions. Herbert L. Whittemore, Ambrose H. Stang, and Vincent B. Phelan. Dec. 28, 1938. 10c.
- BMS12. Structural properties of "Steelox" constructions for walls, partitions, floors, and roofs sponsored by Steel Buildings, Inc. Herbert L. Whittemore, Ambrose H. Stang, and Vincent B. Phelan. Feb. 1, 1939. 15c.
- BMS13. Properties of some fiber building boards of current manufacture. Charles G. Weber and Samuel G. Weissberg. Feb. 23, 1939. 10c.
- BMS14. Indentation and recovery of low-cost floor coverings. P. A. Sigler and Myrtle B. Woodward. Mar. 7, 1939. 10c.
- BMS15. Structural properties of "Wheeling Long-Span Steel Floor" construction sponsored by the Wheeling Corrugating Co. Herbert L. Whittemore, Ambrose H. Stang, and Vincent B. Phelan. Mar. 21, 1939. 10c.
- BMS16. Structural properties of a "Tilecrete" floor construction sponsored by Tilecrete Floors, Inc. Herbert L. Whittemore, Ambrose H. Stang, and Cyrus C. Fishburn. Mar. 24, 1939. 10c.
- BMS17. Sound insulation of wall and floor construction. V. L. Chrisler. Mar. 28, 1939. 20c. Supplement No. 1. Dec. 20, 1940. 5c.
See page 210 for Supplement No. 2.
- BMS18. Structural properties of "Pre-Fab" constructions for walls, partitions, and floors sponsored by the Harnischfeger Corporation. Herbert L. Whittemore, Ambrose H. Stang, and Vincent B. Phelan. May 17, 1939. 10c.
- BMS19. Preparation and revision of building codes. George N. Thompson. May 1939. 15c.
- BMS20. Structural properties of "Twachtman" constructions for walls and floors sponsored by Connecticut Pre-Cast Buildings Corporation. Herbert L. Whittemore, Ambrose H. Stang, and Douglas E. Parsons. Aug. 17, 1939. 10c.
- BMS21. Structural properties of a concrete-block cavity-wall construction sponsored by the National Concrete Masonry Association. Herbert L. Whittemore, Ambrose H. Stang, and Douglas E. Parsons. July 19, 1939. 10c.

- BMS22. Structural properties of "Dun-Ti-Stone" wall construction sponsored by the W. E. Dunn Manufacturing Co. Herbert L. Whittemore, Ambrose H. Stang, and Douglas E. Parsons. Aug. 14, 1939. 10c.
- BMS23. Structural properties of a brick cavity-wall construction sponsored by the Brick Manufacturers Association of New York, Inc. Herbert L. Whittemore, Ambrose H. Stang, and Douglas E. Parsons. Aug. 31, 1939. 10c.
- BMS24. Structural properties of a reinforced brick wall construction and a brick-tile cavity-wall construction sponsored by the Structural Clay Products Institute. Herbert L. Whittemore, Ambrose H. Stang, and Cyrus C. Fishburn. Aug. 24, 1939. 15c.
- BMS25. Structural properties of conventional wood-frame construction for walls, partitions, floors, and roofs. George E. Heck. Sept. 13, 1939. 15c.
- BMS26. Structural properties of "Nelson Pre-Cast Concrete Foundation" wall construction sponsored by the Nelson Cement Stone Co., Inc. Herbert L. Whittemore, Ambrose H. Stang, and Cyrus C. Fishburn. Oct. 9, 1939. 10c.
- BMS27. Structural properties of "Bender Steel Home" wall construction sponsored by The Bender Body Co. Herbert L. Whittemore, Ambrose H. Stang, and Vincent B. Phelan. Oct. 13, 1939. 10c.
- BMS28. Backflow prevention in over-rim water supplies. Gene E. Golden and Roy B. Hunter. Aug. 24, 1939. 10c.
- BMS29. Survey of roofing materials in the Northeastern States. Hubert R. Snoko and Leo J. Waldron. Oct. 11, 1939. 15c.
- BMS30. Structural properties of a wood-frame wall construction sponsored by the Douglas Fir Plywood Association. Herbert L. Whittemore and Ambrose H. Stang, with the collaboration of Thomas R. C. Wilson, Forest Products Laboratory. Sept. 13, 1939. 10c.
- BMS31. Structural properties of "Insulite" wall and "Insulite" partition constructions sponsored by The Insulite Co. Herbert L. Whittemore and Ambrose H. Stang, with the collaboration of Thomas R. C. Wilson, Forest Products Laboratory. Oct. 26, 1939. 15c.
- BMS32. Structural properties of two brick-concrete-block wall constructions and a concrete-block wall construction sponsored by the National Concrete Masonry Association. Herbert L. Whittemore, Ambrose H. Stang, and Douglas E. Parsons. Nov. 2, 1939. 15c.
- BMS33. Plastic calking materials. J. J. Tregoning, K. A. Milliken, A. Hockman, W. H. Sligh, and D. W. Kessler. Jan. 20, 1940. 15c.
- BMS34. Performance test of floor coverings for use in low-cost housing: part 1. Percy A. Sigler and Elmer A. Koerner. Jan. 15, 1940. 15c.
- BMS35. Stability of sheathing papers as determined by accelerated aging. Samuel G. Weissberg, Daniel A. Jessup, and Charles G. Weber. Dec. 22, 1939.
- BMS36. Structural properties of wood-frame wall, partition, floor, and roof constructions with "Red Stripe" lath sponsored by The Weston Paper and Manufacturing Co. Herbert L. Whittemore and Ambrose H. Stang, with the collaboration of Thomas R. C. Wilson, Forest Products Laboratory. Jan. 2, 1940. 10c.
- BMS37. Structural properties of "Palisade Homes" constructions for walls, partitions, and floors sponsored by Palisade Homes. Herbert L. Whittemore and Ambrose H. Stang, with the collaboration of Thomas R. C. Wilson, Forest Products Laboratory. Feb. 13, 1940.
- BMS38. Structural properties of two "Dunstone" wall constructions sponsored by the W. E. Dunn Manufacturing Co. Herbert L. Whittemore, Ambrose H. Stang, and Douglas E. Parsons. Feb. 7, 1940. 10c.
- BMS39. Structural properties of a wall construction of "Pfeifer Units" sponsored by the Wisconsin Units Co. Herbert L. Whittemore, Ambrose H. Stang, and Douglas E. Parsons. Jan. 31, 1940. 10c.
- BMS40. Structural properties of a wall construction of "Knap Concrete Wall Units" sponsored by Knap America Inc. Herbert L. Whittemore, Ambrose H. Stang, and Cyrus C. Fishburn. Feb. 21, 1940. 15c.
- BMS41. Effect of heating and cooling on the permeability of masonry walls. Cyrus C. Fishburn and Perry H. Petersen. Jan. 11, 1940.
- BMS42. Structural properties of wood-frame wall and partition constructions with "Celotex" insulating boards sponsored by The Celotex Corporation. Herbert L. Whittemore and Ambrose H. Stang, with the collaboration of Thomas R. C. Wilson, Forest Products Laboratory. Mar. 2, 1940. 15c.
- BMS43. Performance test of floor coverings for use in low-cost housing: part 2. Percy A. Sigler and Elmer A. Koerner. Feb. 13, 1940. 15c.

- BMS44. Surface treatment of steel prior to painting. Rolla E. Pollard and Wilbur C. Porter. Apr. 8, 1940. 10c.
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- BMS46. Structural properties of "Scot-Bilt" prefabricated sheet-steel constructions for walls, floors, and roofs sponsored by The Globe-Wernicke Co. Herbert L. Whittemore, Ambrose H. Stang, and Vincent B. Phelan. May 23, 1940. 10c.
- BMS47. Structural properties of prefabricated wood-frame constructions for walls, partitions, and floors sponsored by American Houses, Inc. Herbert L. Whittemore and Ambrose H. Stang, with the collaboration of Thomas R. C. Wilson, Forest Products Laboratory. June 3, 1940. 20c.
- BMS48. Structural properties of "Precision-Built" frame wall and partition constructions sponsored by the Homasote Co. Herbert L. Whittemore and Ambrose H. Stang, with the collaboration of George E. Heck, Forest Products Laboratory. May 13, 1940. 15c.
- BMS49. Metallic roofing for low-cost house construction. Leo J. Waldron. May 7, 1940. 20c.
- BMS50. Stability of fiber building boards as determined by accelerated aging. Daniel A. Jessup, Charles G. Weber, and Samuel G. Weissberg. May 13, 1940. 10c.
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- BMS57. Roofing in the United States — Results of a questionnaire. Leo J. Waldron and Hubert R. Snoke. Sept. 18, 1940.
- BMS58. Strength of soft-soldered joints in copper tubing. Arthur R. Maupin and William H. Swanger. Sept. 20, 1940. 10c.
- BMS59. Properties of adhesives for floor coverings. Percy A. Sigler and Robert I. Martens. Sept. 19, 1940. 10c.
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- BMS62. Structural properties of a precast joist concrete floor construction sponsored by the Portland Cement Association. Herbert L. Whittemore, Ambrose H. Stang, and Douglas E. Parsons. Oct. 31, 1940. 10c.
- BMS63. Moisture condensation in building walls. Harold W. Woolley. Dec. 14, 1940. 15c.
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- BMS65. Methods of estimating loads in plumbing systems. Roy B. Hunter. Dec. 16, 1940. 15c.
- BMS66. Plumbing Manual. Nov. 22, 1940.
- BMS67. Structural properties of "Mu-Steel" prefabricated sheet-steel constructions for walls, partitions, floors, and roofs sponsored by Herman A. Mugler. Herbert L. Whittemore, Ambrose H. Stang, and Vincent B. Phelan. Apr. 12, 1941. 15c.
- BMS68. Performance test of floor coverings for use in low-cost housing: part 3. Percy A. Sigler and Elmer A. Koerner. Jan. 31, 1941. 20c.
- BMS69. Stability of fiber sheathing boards as determined by accelerated aging. Daniel A. Jessup, Charles G. Weber, and Samuel G. Weissberg. Jan. 22, 1941. 10c.
- BMS70. Asphalt, prepared roll roofings and shingles. Hubert R. Snoke. Apr. 10, 1941. 20c.

- BMS71. Fire tests of wood- and metal-framed partitions. S. H. Ingberg and Nolan D. Mitchell. May 12, 1941. 20c.
- BMS72. Structural properties of "Precision-Built, Jr." prefabricated wood-frame wall construction sponsored by the Homasote Co. Archie H. Easton and Mahlon F. Peck, with the collaboration of R. F. Luxford, Forest Products Laboratory. Apr. 14, 1941. 10c.
- BMS73. Indentation characteristics of floor coverings. Percy A. Sigler and Myrtle B. Woodward. Apr. 15, 1941. 10c.
- BMS74. Structural and heat-transfer properties of "U. S. S. Panelbilt" prefabricated sheet-steel constructions for walls, partitions, and roofs sponsored by the Tennessee Coal, Iron & Railroad Co. Herbert L. Whittemore, Ambrose H. Stang, Vincent B. Phelan, and Richard S. Dill. June 30, 1941. 15c.
- BMS75. Survey of roofing materials in the North Central States. Hubert R. Snoke and Leo J. Waldron. July 1, 1941. 15c.
- BMS76. Effect of outdoor exposure on the water permeability of masonry walls. Cyrus C. Fishburn, Douglas E. Parsons, and Perry H. Petersen. Aug. 15, 1941. 15c.
- BMS77. Properties and performance of fiber tile boards. Daniel A. Jessup, Herman Bogaty, and Samuel G. Weissberg. Aug. 8, 1941. 10c.
- BMS78. Structural, heat-transfer, and water-permeability properties of five earth-wall constructions. Herbert L. Whittemore, Ambrose H. Stang, Elbert Hubbell, and Richard S. Dill. Oct. 1, 1941. 25c.
- BMS79. Water-distributing systems for buildings. Roy B. Hunter. Nov. 5, 1941. 20c.
- BMS80. Performance test of floor coverings for use in low-cost housing: part 4. Percy A. Sigler and Elmer A. Koerner. Mar. 2, 1942. 15c.
- BMS17. (Supplement No. 2). Sound insulation of wall and floor construction.

This supplement reports the results of sound-transmission measurements made on a number of additional types of construction since the issuance of the original report in March 1939, and the first Supplement issued December 20, 1940. Sept. 15, 1947. 15 p. 10c.

BMS81. Field inspectors' check list for building construction.

Report of Subcommittee on Structure, Central Housing Committee on Research, Design, and Construction

This Check List is intended to be used as a guide and daily reminder to field inspectors on building construction projects. It was prepared by a committee of representatives of Federal agencies active in the building field. In the preparation of the report the committee had the benefit of the experience of its members and consultants, supplemented by data from technical reports.

The list is set up in practical form, in that it outlines the progress of the work by stages rather than by trades. As a result, the inspector can follow the course of erection day by day in its proper sequence without consulting an index to locate information on specific phases of the project. Each successive stage is clearly indicated, and further details on special items are given in the appendices. April 8, 1942. 68 p. 20c.

BMS82. Water permeability of walls built of masonry units. Cyrus C. Fishburn

The water permeabilities of small masonry wall specimens were measured. Fourteen kinds of workmanship, 39 kinds of units, and 10 kinds of mortars were represented in a group of 140 walls.

The permeability of the specimens was low when the vertical joints were filled or partly filled with mortar or grout, when the suction of the bricks was low, and when a mortar having a high water retentivity was used. The effect of water retentivity of the mortars on the permeability of the walls was greatest when the brick-suction was high. Mortar having a low water retentivity stiffened rapidly when placed in contact with dry, highly absorptive bricks, and units having a low suction floated out of alinement when placed in contact with such a mortar. April 15, 1942. 37 p. 25c.

BMS83. Strength of sleeve joints in copper tubing made with various lead-base solders. Arthur R. Maupin and William H. Swanger

A previous investigation on soft-soldered sleeve joints in copper tubing for domestic plumbing lines and other uses dealt with joints made with two tin-base solders. To supplement that investigation, the present one on similar joints made with various lead-base solders was conducted. Solders of the following types were used: lead-silver, lead-tin-antimony, lead-cadmium, high lead-low tin, and high-purity lead. Tensile tests at room temperature (short-time tests) were made, together with long-time tests at temperatures ranging from 85° to 325°F. The information from the latter tests is

much more useful than the results of the short-time tests in evaluating soldered joints for service. Consideration must always be given also to possible bond deterioration of the soldered joint at elevated temperatures. On the basis of the results of the first investigation, joints in copper made with tin-base solders were considered satisfactory for general use, provided the temperature did not exceed 250°F. The results of the present study have shown that similar joints made with lead-base tin-free solders can be used with safety at temperatures as high as 325°F. May 5, 1942. 9 p. 10c.

BMS84. Survey of roofing materials in the South Central States.

Hubert R. Snoke and Leo J. Waldron

A survey of the weathering qualities and of the extent of use of the various roofing materials on dwellings in the South Central States is described, with numerous references to similar surveys in the Southeastern, Northeastern, and North Central States.

Detailed studies of roofing materials in Chattanooga and Memphis, Tenn.; Jackson, Miss.; New Orleans, La.; Houston, Dallas, San Antonio, and Amarillo, Tex.; Oklahoma City, Okla.; Little Rock, Ark.; and Louisville, Ky., are reported.

A tabulation, by States, of the kinds of roofing materials used on 9,500 rural and small-town dwellings, along approximately 4,200 miles of highway between the cities listed above, is included; also a summary of the kinds of roofing materials used on more than 38,000 rural and small-town dwellings along approximately 11,000 miles of highway in the 37 States covered by the four surveys.

Forty-eight photographs, illustrating the types of weathering of roofing materials, and features of the design and construction of roofs are shown. May 5, 1942. 19 p. 15c.

BMS85. Dimensional changes of floor coverings with changes in relative humidity and temperature.

Percy A. Sigler, Robert I. Martens, and Elmer A. Koerner

The effects of changes in atmospheric conditions on the dimensions of floor coverings were investigated. The floor coverings tested included such general types as linoleum, cork, rubber, felt base, asphalt, strip wood, plywood, fiberboard, and several monolithic compositions, such as cement mortar and magnesium oxychloride. Dimensional changes due to a variation in relative humidity from 8 to 86 percent and those due to a variation in temperature from 32° to 90°F were determined. The floor coverings, testing equipment, and procedure are described, and the results are presented in graphic form.

Changes in relative humidity affect the dimensions of many floor coverings to a much greater extent than do changes in temperature within the range usually encountered in structures. Such floor coverings as strip wood, linoleum, and felt show a much greater dimensional change in the across-grain or across machine direction than in the grain or machine direction. The several monolithic compositions showed relatively small changes in dimensions. July 15, 1942. 7 p. 10c.

BMS86. Structural, heat-transfer, and water-permeability properties of "Speedbrik" wall construction sponsored by the General Shale Products Corporation.

Mahlon F. Peck, Vincent B. Phelan, Richard S. Dill, and Perry H. Petersen

For the program on the investigation of low-cost house constructions, specimens representing "Speedbrik" masonry wall construction were submitted by the General Shale Products Corporation. These specimens were subjected to structural, heat-transfer, and water-permeability tests.

The structural specimens were subjected to compressive, transverse, concentrated, impact, and racking loads, for each of which three like specimens were tested. The transverse, concentrated, and impact loads were applied to the inside face of the specimens.

The deformation under load and the set after the load was removed were measured for each increment of load.

Heat-transfer properties of two specimens were determined in a shielded hot-box heat-transfer apparatus.

Nine water-permeability specimens were tested under conditions that simulated exposure to a heavy wind-driven rain. July 15, 1942. 17 p. 15c.

BMS87. A method for developing specifications for building construction.

Report of Subcommittee on Specifications, Central Housing Committee on Research, Design, and Construction

To meet the demand for short and uniform specifications for Government building construction, and in an attempt to reduce the time and labor now consumed in their

preparation, a representative committee of Federal agencies has made a study of current specification-writing routine. In its report, this committee advocates a directive method which, under proper supervision, should condense specifications, bring about important economies, and increase efficiency.

Fundamental principles that have proved of value over a period of years have been retained, and are coordinated in a basic specification which promotes uniformity and permits choice of those materials and methods of construction best suited to the specific project in hand.

Application of the method is made clear by three examples: a model basic specification illustrating the procedure outlined, a typical contemporary specification, and the typical specification rewritten in accordance with the method advocated. July 15, 1942. 23 p. 15c.

BMS88. Recommended building code requirements for new dwelling construction with special reference to war housing.

Report of Subcommittee on Building Codes, Central Housing Committee on Research, Design, and Construction

A series of recommended requirements suitable for use in building codes is presented. The requirements apply to single- and two-family houses and to multiple dwellings of limited height. They cover such matters as fire resistance, light and ventilation, exits, strength of construction, and chimneys and fireplaces. In general, good practice is required, certain well-recognized standards and specifications being cited as acceptable evidence of good practice. Specific dimensions and other details are given where necessary. The report contains an appendix, in which additional information is given, including methods of meeting specific code provisions and references to source material. Sept. 25, 1942. 86 p. Superseded by BMS107.

BMS89. Structural properties of "Precision-Built, Jr." (second construction) prefabricated wood-frame wall construction sponsored by the Homasote Co.

W. Gail Hoback, Herman L. Weiss, and Vincent B. Phelan (with the collaboration of the Forest Products Laboratory)

For the program on the determination of the structural properties of low-cost house constructions, the Homasote Co., Trenton, N. J., submitted 18 specimens, representing a wall construction consisting of a wood frame with "Homasote" insulating fiberboard on the inside face and bevel siding on the outside face.

The specimens were subjected to compressive, transverse, concentrated, impact, and racking loads, for each of which three like specimens were tested. The transverse, concentrated, and impact loads were applied to both faces of the specimens.

The deformation under load and the set after the load was removed were measured for each increment of load. The results are presented in graphs and tables. July 17, 1942. 15 p. 15c.

BMS90. Structural properties of "PHC" prefabricated wood-frame constructions for walls, floors, and roofs sponsored by the PHC Housing Corporation Mahlon F. Peck, W. Gail Hoback, and Vincent B. Phelan with the collaboration of Carlile P. Winslow, Forest Service

For the program on the determination of the structural properties of low-cost housing, the PHC Housing Corporation submitted 33 specimens representing "PHC" prefabricated wood-frame constructions for walls, floors, and roofs.

The wall specimens were subjected to compressive, transverse, concentrated, impact, and racking loads; the floor specimens to transverse, concentrated, and impact loads; and the roof specimens to transverse and concentrated loads. The transverse, concentrated, and impact loads were applied to both faces of wall specimens. For each of the loads, three like specimens were tested; the concentrated loads were applied to the same specimens as either the transverse or the impact loads. The loads simulated the loads to which the elements of a house are subjected in actual service.

The deformation under load and the set after the load was removed were measured for each increment of load. The results are presented in graphs and tables. August 18, 1942. 34 p. 15c.

BMS91. A glossary of housing terms.

Compiled by Subcommittee on Definitions, Central Housing Committee on Research, Design, and Construction

This glossary brings together the various terms used in the field of housing and has been prepared to eliminate the confusion arising from the use of vaguely defined terms or from attributing several meanings to the same term. Whenever possible, definitions have been chosen which are already widely used in codes and statutes. In selecting terms for inclusion in the glossary, reference has been made to building

codes, housing laws, and zoning ordinances, as well as to a large number of standard works. The definitions have been checked with foreign sources, especially "The International Glossary of Housing Terms" published by the International Federation for Housing and Town Planning. A glossary published early in 1937 by a committee from five principal Federal agencies concerned with housing was used as a basis of the present document. Sept. 3, 1942. 32 p. 15c.

BMS92. Fire-resistance classifications of building constructions.

Report of Subcommittee on Fire-Resistance Classifications, Central Housing Committee on Research, Design, and Construction

A classification of building construction from the standpoint of fire safety is presented by a committee of representatives of Federal agencies concerned with the design, construction, and operation of buildings. By considering only the basic properties having a bearing on fire hazard and fire resistance, four types were found sufficient to cover the whole range of building construction. Within each type are two or more classes which are defined by the fire resistance required for their structural members. In chapter I this classification is outlined and information given on how it can be applied with reference to the fire severity obtaining for given structural and occupancy conditions. Chapter II contains a discussion of the types of restrictions and limitations generally incorporated in building codes, with particular reference to their application to the classification of building types herein presented. Chapter III gives results of surveys of combustible contents of buildings housing typical occupancies as a basis for estimating fire severity. In chapter IV are given available fire-resistance ratings of building constructions and fire-resistance classifications of roofing materials. Oct. 7, 1942. 70 p. 30c.

BMS93. Accumulation of moisture in walls of frame construction during winter exposure......Charles G. Weber and Robert C. Reichel

Data were obtained on the accumulation of moisture in seven types of walls during winter weather. The walls tested were full-height sections in the north outside wall of a frame house on the Bureau grounds. A relatively high humidity was maintained to produce an average drop in vapor pressure across the wall of about 0.2 pound per square inch, which is approximately that produced by an inside relative humidity of 50 percent at about 72°F when the outside temperature is 0°F, or below. Nov. 4, 1942. 5 p. 10c.

BMS94. Water permeability and weathering resistance of stucco-faced gunite-faced, and "Knap Concrete-Unit" walls......Cyrus C. Fishburn

The water permeabilities of small stucco, and gunite-faced walls and of walls built of "Knap concrete units" were measured before and after outdoor weathering. Six kinds of stucco facings, 2 thicknesses of gunite facings, and 7 kinds of units were represented in a group of 26 walls.

All of the stucco- and gunite-faced walls were highly resistant to water penetration. Periods of outdoor exposure at Washington, D. C., varying from 16 to 49 months, had no important effect on permeability. The resistance to penetration of walls built of "Knap concrete units" was excellent after the walls were painted. Dec. 2, 1942. 20 p. 10c.

BMS95. Tests of cement-water paints and other waterproofings for unit-masonry walls......Cyrus C. Fishburn and Douglas E. Parsons

One hundred thirty-one small, highly permeable masonry wall specimens built of concrete blocks or of bricks were treated with cement-water paints or with other waterproofings. The effectiveness of the treatments was measured by comparing the permeability of the walls, before and after treatment, when they were subjected to conditions simulating wind-driven rain. The durability of some treatments was observed by again testing the specimens after they had been weathered outdoors.

The cement-water paints were effective waterproofings and could be applied to the best advantage on the walls of concrete blocks with stiff, rather than soft, brushes. The admixture of fine sand to the paint for the first coat applied to the coarse-textured concrete block increased the effectiveness and durability of the paints. Thick paint films resulting from the application of excessive amounts of paint were effective when first applied, but they were much less durable than thinner coatings. The permeability of the paint films of average thickness was lower after weathering than before.

The colorless waterproofings were generally ineffective. Only one of the colorless waterproofings was satisfactory when first applied, but it was not durable and was much more permeable than the best cement-water paint treatments. The data confirm results previously obtained, which indicate that the only effective and durable method of waterproofing brick walls without changing their appearance was by repointing or grouting of the face joints.

A series of built-in waterproof membranes was an effective waterproofing for brick walls if the leakage through the facing was drained out of the wall through weep holes at the bottom.

The bituminous coatings applied to the inside faces of the walls were ineffective as waterproofings. March 15, 1943. 37 p. 25c.

BMS96. Properties of a porous concrete of cement and uniform-sized gravel.

Perry H. Petersen

The physical properties of a porous concrete consisting solely of portland cement, water, and uniform-sized gravel were investigated. Each of three coarse aggregates, grits (No. 8 to No. 4), pea gravel (No. 4 to $\frac{3}{8}$ inch), and $\frac{3}{4}$ -inch gravel ($\frac{3}{8}$ to $\frac{3}{4}$ inch), was used, with $2\frac{1}{2}$ bags of cement per cubic yard in concrete tamped in place and 3 bags per cubic yard when no compacting was done. Walls, wallettes, beams, and bond pull-out specimens were tested, as well as 6- by 12-inch control cylinders. Compressive, transverse, shearing, and bond strengths are reported, as well as resistance to heat transfer, water penetration by capillarity, and rain penetration. March 18, 1943. 15 p. 10c.

BMS97. Experimental dry-wall construction with fiber insulating board.

Charles G. Weber and Robert C. Reichel

The use of fiber insulating boards for the interior surfacing of walls and ceilings of houses has heretofore been limited with respect to choice of design of finish of the walls. The relatively high expansivity of the material with variations in the humidity of the surrounding air has made paneling necessary because molding or batten strips were required to conceal unsightly joints. It was found possible to overcome the difficulty and make paneling unnecessary. This was done by eliminating the usual nailing and substituting the use of invisible, flexible fasteners that permit the entire surface of a wall or ceiling to expand and contract as a unit.

Several methods of fastening the boards to obtain this result were developed. Use of them permitted the successful application of all of the decorative treatments normally applied to a plaster wall, without restriction as to surface design. May 7, 1943. 8 p. 10c.

BMS98. Physical properties of terrazzo aggregates.

Daniel W. Kessler, Arthur Hockman, and Ross E. Anderson

In order to develop basic data for terrazzo specifications, comparative tests were made on 77 marbles used as aggregates. The samples included calcites, dolomites, dolomitic marbles, serpentines, and travertines. Properties studied were abrasive resistance absorption, bulk specific gravity, and toughness of the original rock, and dust content, percentage of voids, and thickness grading of the chips. A few samples were studied for volume changes caused by moisture and temperature.

Flat or elongated chips were found to increase the voids in aggregates, and evidence was found to indicate that the shielding effect of flat chips may interfere with the removal of excess cement paste from mixtures in the rolling operation. May 20, 1943. 19 p. 15c.

BMS99. Structural and heat-transfer properties of "Multiple Box-Girder Plywood Panels" for walls, floors, and roofs sponsored by Loren H. Wittner. Herbert L. Whittemore, Vincent B. Phelan, and Richard S. Dill, with the collaboration of R. F. Luxford, Forest Products Laboratory.

To determine structural and heat-transfer properties, tests were conducted at the request of the War Department on wall, floor, and roof specimens of "Multiple Box-Girder Plywood Panels." The specimens were constructed by gluing and nailing one sheet of plywood between two frames and facing the outer surfaces with other sheets of plywood. The longitudinal and transverse members of the frames with the sheets of plywood formed closed cells, which provided heat insulation.

The wall specimens were subjected to compressive, transverse, concentrated, impact, and racking loads; the floor specimens to transverse, concentrated, and impact loads; and the roof specimens to transverse and concentrated loads. The loads simulated the loads to which the elements are subjected in actual service.

The deformations under load and the sets after the load was removed were measured for uniform increments of load. The results are presented in graphs and tables.

The heat-transfer properties of three wall specimens were determined in a shielded hot-box heat-transfer apparatus. June 11, 1943. 25 p. 15c.

BMS100. Relative slipperiness of floor and deck surfaces. Percy A. Sigler

A new pendulum-type machine and a method for determining the relative slipperiness of floor surfaces under various conditions are described. The surfaces were tested when dry and clean, dry and dirty, wet and clean, wet and dirty, wet and

soapy, and in a few cases, oily. The results of tests of various floor materials are given, including such general types as stone, terrazzo, cement-mortar, magnesite, ceramic tile, metal, asphalt, rubber, linoleum, and wood. The surfaces of the materials were tested after grinding them with No. 180 silicon carbide. Tests were also made of the original surfaces of many of the materials. The test data show the effect of different wax finishes on the antislip properties of several selected floor materials.

In general, considerable difference in slipperiness was found between dry and wet surfaces. Most of the floor materials showed satisfactory antislip properties when dry. Many would be classed as hazardous when wet. July 1, 1943. 12 p. 10c.

BMS101. Strength and resistance to corrosion of ties for cavity walls.

Cyrus C. Fishburn

The resistance to axial loads of ties for cavity walls was determined by testing steel and cement-asbestos ties when they were embedded at the ends in brick masonry. Fourteen different ties and three mortars were represented in a group of about 110 specimens. The ties, with one exception, when spaced one to every 3 ft² of wall area, provided connections of ample strength to resist the usual lateral forces to which cavity walls are subjected.

The corrosion resistance of some of the steel ties was measured by exposing them when unprotected and when coated to accelerated and to outdoor weathering. July 1, 1943. 9 p. 10c.

BMS102. Painting steel.....Wilbur C. Porter

More than 60 priming paints for plain and galvanized steel surfaces were tested. Because some of these primings were duplicates or near duplicates and others were considered unsuitable, only 41 have been selected for this report. Accelerated laboratory and outdoor exposure tests were employed to determine the relative protective value of these primings when applied to treated and untreated galvanized and plain steel panels. Particularly effective protection against corrosion was observed when primings of the synthetic resin zinc chromate type were used over a phosphate-treated surface. Special attention was given to the effect of pretreating new galvanized steel before painting. More than 2,000 galvanized and plain steel panels were prepared for exposure in the various tests. The relative durability to outdoor exposure of 15 topcoat paints is also discussed. Oct. 16, 1944. 12 p. 10c.

BMS103. Measurements of heat losses from slab floors.

Richard S. Dill, William C. Robinson, and Henry E. Robinson

Observations of heat-transfer properties of four concrete floors laid on the ground and three concrete and one wood floor laid over crawl spaces were made in a special structure provided at the National Bureau of Standards for the purpose. This paper gives quantitative information on the results of these observations and suggests some factors for estimating heat losses through floors. March 10, 1945. 21 p. 10c.

BMS104. Structural properties of prefabricated plywood lightweight construction for walls, partitions, floors, and roofs sponsored by the Douglas Fir Plywood Association.

Arnold Wexler, Sanford B. Newman, and Vincent B. Phelan

For the program on the determination of structural properties of low-cost house constructions, the Douglas Fir Plywood Association submitted 75 specimens representing prefabricated plywood building panels of both lightweight stress-skin and commercial design. Wall, partition, floor, and roof specimens were of lightweight stress-skin design. Specimens of commercial type panels (2- by 4-in. studs) were for wall construction only, and furnished a basis of comparison of strength and weight with the lightweight constructions.

The wall specimens were subjected to compressive, transverse, concentrated, impact, and racking loads; and the wall specimens of commercial type included three different constructions for determining resistance to racking. The partition specimens were subjected to compressive, transverse, impact, and racking loads; the floor specimens to transverse, concentrated, and impact loads; and the roof specimens to transverse and concentrated loads. The floor and roof specimens included two different constructions for determining resistance to transverse loads. Transverse, concentrated, and impact loads were applied to both faces of wall specimens. The loads simulated the loads to which the elements are subjected in actual service.

The deflection under load and the sets after the load was removed were measured for uniform increments of load. The results are presented in graphs and tables. Nov. 1, 1945. 48 p. 25c.

BMS105. Paint manual: With particular reference to Federal Specifications.

Percy H. Walker and Eugene F. Hickson

The Paint Manual is intended to aid in the interpretation of Federal Specifications relating to paint materials and painting. It contains recommendations by the National Bureau of Standards and cooperating organizations for the most effective use of paint materials whose composition requirements and performance standards are covered in Federal Specifications. Procedures for the preparation of surfaces prior to painting as well as mixing, sampling, inspection, and precautions for safety in the use of paint are suggested and recent developments in the field of painting are explained.

A glossary of selected paint terms and pertinent references are included. October 11, 1945. 165 p. \$1.00.

BMS106. Laboratory observations of condensation in wall specimens.

Richard S. Dill and H. V. Cottony

Tests were made using a wall specimen equipped with eight different arrangements of barriers or seals intended to protect insulation in wall specimens from damage caused by condensation of water vapor. Each arrangement was tested in an apparatus by means of which it was exposed to warm moist air on one side and cold air on the other side so that the effectiveness of the vapor barrier in protecting the insulation and timber from condensation could be observed.

Temperature was closely controlled on both sides of the test specimen and water vapor was generated on the warm side at a rate sufficient to maintain a chosen humidity. Water and frost forming within and on the cold side of the specimen were collected in order to determine its permeability to the passage of water vapor. The importance of a watertight edge seal in obtaining the maximum protection with a vapor barrier was indicated. Aug. 2, 1946. 9 p.

BMS107. Building code requirements for new dwelling construction, recommended by the National Housing Agency and prepared in consultation with the National Bureau of Standards.....George N. Thompson

Recommended minimum requirements for dwelling construction, developed by the National Housing Agency in consultation with the National Bureau of Standards, are presented for consideration by local authorities in revising their building codes. The requirements are based on an earlier publication "Recommended Building Code Requirements for New Dwelling Construction", which has been revised in the light of suggestions from governmental housing agencies, the Forest Products Laboratory, and many industrial organizations. They make free use of national standards, with such additions, modifications, and exceptions as the experience of the housing agencies has demonstrated to be advisable in the case of dwelling construction. An appendix supplies information intended to be helpful in applying and interpreting the provisions of the requirements themselves. Jan. 1, 1947. 43 p. 20c. Supersedes BMS88.

BMS108. Temperature distribution in a test bungalow with various heating devices.

Richard S. Dill and Paul R. Achenbach

The comparative uniformity of temperature distribution attained with various types of heating devices or systems was determined in a test bungalow at the National Bureau of Standards. The heating appliances tested included a hot water heating system, floor furnaces located in several different positions, space heaters with fans, and electric and oil-burning warm-air furnaces. Each heating device was observed under a variety of weather conditions. The conditions inside and the weather outside the laboratory were recorded for comparison. Vertical temperature differences were computed for 32°F outside on the assumption that such differences are proportional to the inside-outside temperature difference. Feb. 28, 1947. 14 p. 10c.

BMS109. Strength of houses: Application of engineering principles to structural design.

Herbert L. Whittemore, John B. Cotter, Ambrose H. Stang, and Vincent B. Phelan.

Methods are here presented for designing small houses to provide adequate strength without waste of material.

For each element of a house, design loads for walls, floors, and roofs — compressive, transverse, and racking — were determined by the accepted principles of engineering mechanics for typical one- and two-story frame houses in several locations representative of extreme wind and snow loads in the United States.

Allowable loads for 100 wall, partition, floor, and roof constructions were obtained by loading large specimens in the laboratory at the National Bureau of Standards. The results of these tests are covered in the "structural properties" reports of the Building

Materials and Structures series. Allowable loads for each of these constructions are compared in this report with design loads for two houses in three locations. The comparison shows that some had insufficient strength while others were much stronger than is necessary. Damage by storm would be negligible and waste of material avoided if houses were designed according to the principles embodied herein. 1948. 132 p. \$1.50.

BMS110. Paints for exterior masonry walls.....Clara Sentel

Results of a series of tests in which four classes of masonry paints (cement-water, resin-emulsion, oil-base, and synthetic-rubber) were applied to test walls of porous masonry, are discussed in this report. The specimens were constructed of new and used common brick; cast concrete; stone-, cinder-, and lightweight aggregate-concrete block; and wood frame with cement-asbestos shingles. The walls were exposed to atmospheric conditions in Washington, D. C., for approximately 3 years.

Formulas for the paints and erection of the wall sections are described, as well as methods of applying paint to the specimens. Ratings based on weathering characteristics of each type of paint and evaluation of painting methods for coating the surfaces are given.

Results of the same tests for a 6-year period are shown graphically in the appendix. Nov. 15, 1947. 19 p. 15c.

BUILDING AND HOUSING PUBLICATIONS

This series contains reports of investigations and recommended requirements for building and housing. However, the majority of the reports in this series are obsolete and out of print.

- BH1. Recommended minimum requirements for small dwelling construction. 1922.
(Superseded by BH18).
- BH2. Recommended minimum requirements for plumbing in dwellings and similar buildings. 1923. (Superseded by BH13).
- BH3. A zoning primer. 2d ed. 1926.
- BH4. How to own your home: A handbook for prospective home owners. 1923.
(Superseded by BH17).
- BH5. A standard state zoning enabling act. 2d ed. 1926.
- BH6. Recommended minimum requirements for masonry wall construction. 1924.
(Superseded by M174).
- BH7. Minimum live loads allowable for use in design of buildings. 1924.
- BH8. Recommended practice for arrangement of building codes. 1925.
- BH9. Recommended building code requirements for working stresses in building materials. 1926.
- BH10. A city planning primer. 1928.
- BH11. A standard city planning enabling act. 1928.
- BH12. Present home financing methods. 1928.
- BH13. Recommended minimum requirements for plumbing in dwellings and similar buildings. 1928. (Supersedes BH2). 75c.
- BH14. Recommended minimum requirements for fire resistance in buildings. 1930.
- BH15. Care and repair of the house. 1931. 20c.
- BH16. The preparation of zoning ordinances. 1931.
- BH17. How to own your home. 2d ed. 1931. (Supersedes BH4).
- BH18. Recommended minimum requirements for small dwelling construction. 1932.
(Supersedes BH1).

MATHEMATICAL TABLES

The tables listed below (with the exception of MT15) were prepared by the Project for the Computation of Mathematical Tables conducted by the Federal Works Agency, Work Projects Administration for the city of New York, under the sponsorship of and made available through the National Bureau of Standards. They are of special interest to physicists, engineers, chemists, biologists, mathematicians, computers, and others engaged in scientific and technical work.

The tables have been arranged in the following groups: Those obtainable from : (1) the Superintendent of Documents, Government Printing Office, (2) Columbia University Press, and (3) those available elsewhere.

(1) TABLES OBTAINABLE FROM THE SUPERINTENDENT OF DOCUMENTS

- MT1. Table of the first ten powers of the integers from 1 to 1,000.
- MT2. Tables of the exponential function e^x . \$3.00.
- MT3. Tables of circular and hyperbolic sines and cosines for radian arguments. \$2.50.
- MT4. Tables of sines and cosines for radian arguments. \$2.00.
- MT5. Tables of sine, cosine, and exponential integrals, volume I. \$2.75.
- MT6. Tables of sine, cosine, and exponential integrals, volume II. \$2.00.
- MT7. Table of natural logarithms, volume I. \$3.00.
- MT8. Tables of probability functions, volume I. \$2.00.
- MT9. Table of natural logarithms, volume II. \$3.00.
- MT10. Table of natural logarithms, volume III. \$3.00.
- MT11. Tables of the moments of inertia and section moduli of ordinary angles, channels, and bulb angles with certain plate combinations. \$2.00.
- MT12. Table of natural logarithms, volume IV. \$3.00.
- MT13. Table of sine and cosine integrals for arguments from 10 to 100. \$2.00.
- MT14. Tables of probability functions, volume II. \$2.25.
- MT15. The hypergeometric and Legendre functions with applications to integral equations of potential theory. Chester Snow, National Bureau of Standards.
- MT16. Table of arc tan x . \$2.00.
- MT17. Miscellaneous physical tables: Planck's radiation functions, and electronic function. \$1.50.
- MT18. Table of the zeros of the Legendre polynomials of order 1 — 16 and the weight coefficients for Gauss' mechanical quadrature formula. A. N. Lowan, N. Davids, and A. Levenson. 25c.
- MT19. On the function $H(m, a, x) = \text{EXP}(-ix) F(m+1-ia, 2m+2; ix)$. With table of the confluent hypergeometric function and its first derivative. A. N. Lowan and W. Horenstein. 25c.
- MT20. Table of integrals $\int_0^x J_0(t)dt$ and $\int_0^x Y_0(t)dt$. Arnold N. Lowan and Milton Abramowitz. 25c.
- MT21. Table of $J_0(x) = \int_x^\infty \frac{J_0(t)}{t} dt$ and related functions. Arnold N. Lowan, G. Blanch, and M. Abramowitz. 25c.
- MT22. Table of coefficients in numerical integration formulae. A. N. Lowan and Herbert Salzer.
- MT23. Table of Fourier coefficients....Arnold N. Lowan and Jack Laderman
Reprinted from Journal of Mathematics and Physics, September 1943. 11 p.
- MT24. Coefficients for numerical differentiation with central differences.
Herbert E. Salzer
Reprinted from Journal of Mathematics and Physics, September 1943. 21 p. 25c.
- MT25. Seven-point Lagrangian integration formulas....G. Blanch and I. Rhodes
Reprinted from Journal of Mathematics and Physics, December 1943. 4 p. 25c.
- MT26. A short table of the first five zeros of the transcendental equation $J_0(x)Y_0(kx) - J_0(kx)Y_0(x) = 0$A. N. Lowan and A. Hillman
Reprinted from Journal of Mathematics and Physics, December 1943. 2 p. 25c.

- MT27. Table of coefficients for inverse interpolation with central differences.
Herbert E. Salzer
Reprinted from Journal of Mathematics and Physics, December 1943. 15 p. 25c.
- MT28. Table of $f_n(x) = \frac{n!}{(x/2)^n} J_n(x)$ The Mathematical Tables Project
Reprinted from Journal of Mathematics and Physics, February 1944. 16 p. 25c.
- MT29. Table of coefficients for inverse interpolation with advancing differences.
Herbert E. Salzer
Reprinted from Journal of Mathematics and Physics, May 1944. 28 p. 25c.
- MT30. A new formula for inverse interpolation. H. E. Salzer
Reprinted from Bulletin of the American Mathematical Society, August 1944. 4 p. 25c.
- MT31. Coefficients for interpolation within a square grid in the complex plane.
A. N. Lowan and H. E. Salzer
Reprinted from Journal of Mathematics and Physics, August 1944. 11 p. 25c.
- MT32. Table of coefficients for differences in terms of the derivatives. . . H. E. Salzer
Reprinted from Journal of Mathematics and Physics, November 1944. 4 p. 25c.
- MT33. Table of coefficients for numerical integration without differences. .
A. N. Lowan and H. E. Salzer
Reprinted from Journal of Mathematics and Physics, February 1945. 21 p. 25c.
- MT34. Inverse interpolation for eight-, nine-, ten-, and eleven-point direct interpolation. H. E. Salzer
Reprinted from Journal of Mathematics and Physics, May 1945. 4 p. 25c.
- MT35. Table of coefficients for double quadrature without differences, for integrating second order differential equations. H. E. Salzer
Reprinted from Journal of Mathematics and Physics, November 1945. 6 p. 25c.
- MT36. Formulas for direct and inverse interpolation of a complex function tabulated along equidistant circular arcs. H. E. Salzer
Reprinted from Journal of Mathematics and Physics, November 1945. 3 p. 25c.
- Coordinate conversion tables.
Published as Technical Manual TM 4-238 of the War Department. March 25, 1943. 338 p., 5½ by 8½ in. 40c.
- Hydraulic tables (2d ed.).
Published by the Corps of Engineers, War Department. (1944) 565 p. Blue imitation leather flexible cover, 4½ by 6¾ in. \$1.50.

(2) TABLES OBTAINABLE FROM THE COLUMBIA UNIVERSITY PRESS

The following four tables can be obtained from the Columbia University Press, Morningside Heights, New York 27, N. Y.

- Table of reciprocals of the integers from 100,000 through 200,009.
(1943) 201 p. Buckram cover. \$4.00.
- Table of Bessel functions $J_0(z)$ and $J_1(z)$ for complex arguments.
(1943) 403 p. Buckram cover. \$5.00.
- Table of circular and hyperbolic tangents and cotangents for radian arguments.
(1943) 410 p. Buckram cover. \$5.00.
- Tables of Lagrangian interpolation coefficients.
(1944) 392 p. Buckram cover. \$5.00.
- Table of arc $\sin x$.
(1945) 121 p. Buckram cover. \$3.50.
- Tables of associated Legendre functions.
(1945) 302 p. Buckram cover. \$5.00.

(3) TABLES AVAILABLE ELSEWHERE

The eight tables listed below can be consulted in libraries maintaining a file of mathematical and technical journals. No reprints of them are obtainable from the Bureau.

- On the computation of second differences of the $Si(x)$, $Ei(x)$, and $Chi(x)$ functions.
Arnold N. Lowan
Bulletin of the American Mathematical Society, vol. 45, No. 8, pp. 583-588 (August 1939).
- On the distribution of errors in the n th tabular differences.
Arnold N. Lowan and Jack Laderman
Annals of Statistics, vol. X, No. 4, pp. 360-364 (December 1939).

- Note on the computation of the differences of the $Si(x)$, $Ci(x)$, $Ei(x)$ and $- Ei(-x)$ functions. Milton Abramowitz
 Bulletin of the American Mathematical Society, vol. 46, No. 4, pp. 332-333 (April 1940).
- Errors in Hayashi's table of Bessel functions for complex arguments.
 Arnold N. Lowan and Gertrude Blanch
 Bulletin of the American Mathematical Society, vol. 47, No. 4, pp. 291-293 (April 1941).
- Tables of stellar functions for "point-source" models.
 Published under the title "The Internal Temperature-Density Distribution of the Sun" in the Astrophysical Journal (Yerkes Observatory, Williams Bay, Wis.) vol. 94, pp. 37-45 (July 1941). By G. Blanch, A. N. Lowan, R. E. Marshak, and H. A. Bethe.
- On the inversion of the q -series associated with Jacobian elliptic functions.
 A. N. Lowan, G. Blanch, and W. Horeinstein
 Bulletin of the American Mathematical Society, vol. 48, No. 10, pp. 737-738 (October 1942).
- A table of coefficients for numerical differentiation.
 Arnold N. Lowan, Herbert E. Salzer, and Abraham Hillman
 Bulletin of the American Mathematical Society, vol. 48, No. 12, pp. 920-924 (December 1942).
- Roots of $\sin z = z$ A. P. Hillman and H. E. Salzer
 Gives the first 10 nonzero roots of $\sin z = z$ in the first quadrant to six decimal places.
 Roots of $\sin z = z$, where $z = x + iy$. Philosophical Magazine, Series 7, vol. XXXIV, p. 575 (August 1943).

AUTHORS INDEX, 1901 TO JUNE 30, 1947

A

- Abrams, E., Kanagy, J. R., Charles, A. M., Tener, R. F., Effects of mildew on vegetable-tanned strap leather. *J 36*, 441 (1946) RP1713.
- Achenbach, P. R., Dill, R. S., Effect of soot on the rating of an oil-fired heating boiler. *BMS54* (1940).
- Temperature distribution in a test bungalow with various heating devices. *BMS108* (1947).
- Acken, J. S., Some physical properties of platinum-rhodium alloys. *J 12*, 249 (1934) RP650.
- Acken, J. S., Thompson, J. G., Determination of alumina and silica in steel by the hydrochloric acid residue method. *J 9*, 615 (1932) RP496.
- Acree, S. F., Bates, R. G.:
pH values of certain phosphate-chloride mixtures, and the second dissociation constant of phosphoric acid from 0° to 60° C. *J 30*, 129 (1943) RP1524.
- Effect of sodium chloride on the pH of *p*-phenolsulfonate buffers from 0° to 60° C. *J 32*, 131 (1944) RP1580.
- pH of aqueous mixtures of potassium dihydrogen phosphate and disodium hydrogen phosphate at 0° to 60° C. *J 34*, 373 (1945) RP1648.
- Acree, S. F., Bates, R. G., Diamond, P. T., Eden, M., Salt effects of potassium nitrate, sodium sulfate, and trisodium citrate on the activity coefficients of *p*-phenolsulfonate buffers. *J 37*, 251 (1946) RP1746.
- Acree, S. F., Bates, R. G., Edelstein, M., Reproducibility of the lead electrode and the electromotive force of the lead stick-lead amalgam cell at 0° to 60° C. *J 36*, 159 (1946) RP1697.
- Acree, S. F., Bates, R. G., Hamer, W. J., Manov, G. G., Provisional pH values for certain standard buffer solutions. *J 29*, 183 (1942) RP1495.
- Acree, S. F., Bates, R. G., Siegel, G. L.:
Dissociation constants and pH-titration curves at constant ionic strength from electrometric titration in cells without liquid junction: Titrations of formic acid and acetic acid. *J 30*, 347 (1943) RP1537.
- The second dissociation constant of *p*-phenolsulfonic acid and pH values of phenolsulfonate-chloride buffers from 0° to 60° C. *J 31*, 205 (1943) RP1559.
- Acree, S. F., Burton, J. O., Calculation of the concentration and dissociation constant of each acid group in a mixture from the pH titration curve of the mixture. *J 16*, 525 (1936) RP889.
- Acree, S. F., Burton, J. O., Hamer, W. J., Dissociation constants of malonic acid in its sodium-salt solutions at 25° C from electrometric titration measurements. *J 16*, 575 (1936) RP895.
- Acree, S. F., Burton, J. O., Matheson, H., A glass electrode potentiometer system for the determination of the pH values of weakly buffered solutions such as natural and treated waters. *J 12*, 67 (1934) RP634.
- Acree, S. F., Elliott, M. A., Polar structure of some benzein indicators. *J 23*, 675 (1939) RP1263.
- Acree, S. F., Elliott, M. A., Sklar, A. L., Rapid method for determining ascorbic acid concentration. *J 26*, 117 (1941) RP1364.
- Acree, S. F., Fawcett, E. H., Stabilization of boric acid buffers by aeration. *J 6*, 757 (1931) RP302.
- Acree, S. F., Hall, W. L., Slater, C. S., Preliminary investigations upon two cellulosic wastes as sources for xylose. *J 4*, 329 (1930) RP152.
- Acree, S. F., Hamer, W. J.:
Effects of corrections for liquid-junction potentials of saturated calomel electrodes on dissociation constants obtained by electrometric titration. *J 17*, 605 (1936) RP930.
- Potentiometric method for the accurate measurement of hydrogen-ion activity. *J 23*, 647 (1939) RP1261.
- A method for the determination of the pH of 0.05-molal solutions of acid potassium phthalate with or without potassium chloride. *J 32*, 215 (1944) RP1586.
- A comparison of platinum and palladium hydrogen-electrodes in aqueous solutions of acid potassium phthalate. *J 33*, 87 (1944) RP1598.
- Second dissociation constant of *o*-phthalic acid and related pH values of phthalate buffers from 0° to 60° C. *J 35*, 381 (1945) RP1678.
- Acree, S. F., Hamer, W. J., Burton, J. O., Second ionization constant and related thermodynamic quantities for malonic acid from 0° to 60° C. *J 24*, 269 (1940) RP1284.
- Acree, S. F., Hamer, W. J., Pinching, G. D., pH values of acid-salt mixtures of some aromatic sulfonic acids at various temperatures and a criterion of completeness of dissociation. *J 31*, 291 (1943) RP1567.
- First dissociation constant of *o*-phthalic acid and related pH values of phthalate buffers from 0° to 60° C. *J 35*, 539 (1945) RP1687.
- pH standards at various temperatures: aqueous solutions of acid potassium phthalate. *J 36*, 47 (1946) RP1690.
- Acree, S. F., Hughes, E. E.:
Quantitative formation of furfural from xylose. *J 21*, 327 (1938) RP1132.
- Quantitative formation of furfural and methylfurfural from pentoses and methylpentoses. *J 23*, 293 (1939) RP1233.
- Reaction of bromine with furfural and related compounds. *J 24*, 175 (1940) RP1276.
- Acree, S. F., Kline, G. M.:
A study of the method for titrating aldose sugars with standard iodine and alkali. *J 5*, 1063 (1930) RP247.
- Volumetric determination of pentoses and pentosans. *J 8*, 25 (1932) RP398.
- Acree, S. F., Kline, G. M., Meacham, M. R., On elimination of liquid potentials with potassium chloride and ammonium chloride. *J 8*, 101 (1932) RP403.
- Acree, S. F., Maclean, M. E., Jencks, P. J., Comparison of the purity of samples of organic solvents by ultraviolet spectrophotometry. *J 34*, 271 (1945) RP1643.
- Acree, S. F., Manov, G. G., De Lollis, N. J., Liquid-junction potentials, and relative activity coefficients of chloride ions, in concentrated mixed chlorides and nitrates at 25° C. *J 33*, 273 (1944) RP1608.
- Ionization constant of boric acid and the pH of certain borax-chloride buffer solutions from 0° to 60° C. *J 33*, 287 (1944) RP1609.
- Comparative liquid-junction potentials of some pH buffer standards and the calibration of pH meters. *J 34*, 115 (1945) RP1632.
- Acree, S. F., Manov, G. G., De Lollis, N. J., Lindvall, P. W., Effect of sodium chloride on the apparent ionization constant of boric acid and the pH values of borate solutions. *J 36*, 543 (1946) RP1721.
- Acree, S. F., Maryott, A. A.:
Dipole moment and structure of trioxane. *J 33*, 71 (1944) RP1596.
- Dipole moments and resonance of some benzein indicators and related compounds. *J 38*, 505 (1947) RP1791.
- Acree, S. F., Murray, C. N., The use of saturated ammonium chloride in the elimination of contact potentials. *J 7*, 713 (1931) RP369.
- Acree, S. F., Sager, E. E., Keegan, H. J., Basic ionization constant of metacresolsulfonphthalein; pH values and salt effects. *J 31*, 323 (1943) RP1569.
- Acree, S. F., Sager, E. E., Schooley, M. R., The assay of potassium *p*-phenolsulfonate, its pH range, and its ultraviolet absorption spectrum. *J 31*, 197 (1943) RP1558.
- Acree, S. F., Sager, E. E., Schooley, M. R., Carr, A. S., Ultraviolet spectra and dissociation constants of *p*-hydroxybenzoic acid, methyl, ethyl, *n*-butyl, and benzyl *p*-hydroxybenzoate, and potassium *p*-phenolsulfonate. *J 35*, 521 (1945) RP1686.
- Acree, S. F., Wingfield, B.:
Temperatures and hysteresis errors in calomel half-cells. *J 19*, 163 (1937) RP1018.
- Effects of hydrochloric acid and salts on the absorption of light by *B*-naphthoquinone-sulfonic acid. *J 27*, 361 (1941) RP1424.
- Acree, S. F., Wingfield, B., Naffziger, T. R., Whittemore, E. R., Oerman, C. B., Sweeney, O. R., Production of pressboard from cornstalks. *M123* (1936).
- Acree, S. F., Wingfield, B., Whittemore, E. R., Oerman, C. B., Sweeney, O. R., Paper pulp from

- cereal straws by a modified sulfate process. M124 (1936).
- Adelson, J. S., Whittemore, H. L., Seaquist, E. O., Physical properties of electrically welded steel tubing. J 4, 475 (1930) RP161.
- Adler, L., Cain, J. R., Equilibrium conditions in the system carbon, iron oxide, and hydrogen in relation to the Ledebur method for determining oxygen in steel. S 15, 353 (1919-20) S350.
- Agnew, P. G.:
An approximate experimental method for the analysis of EMF waves. B 6, 95 (1909-10) S119.
A device for measuring the torque of electrical instruments. B 7, 45 (1911) S145.
A study of the current transformer with particular reference to iron loss. B 7, 423 (1911) S164.
A tubular electro-dynamometer for heavy currents. B 8, 651 (1912) S184.
A watt-hour meter method of testing instrument transformers. B 11, 347 (1915) S233.
A new form of vibration galvanometer. S 16, 37 (1920) S370.
- Agnew, P. G., Fitch, T. T., The determination of the constants of instrument transformers. B 6, 281 (1909-10) S130.
- Agnew, P. G., Lloyd, M. G.:
Effect of phase of harmonics upon acoustic quality. B 6, 255 (1909-10) S127.
The regulation of potential transformers, and the magnetizing current. B 6, 273 (1909-10) S129.
- Agnew, P. G., Silsbee, F. B., Accuracy of the formulas for the ratio, regulation, and phase angle of transformers. B 10, 267 (1914) S211.
- Agnew, P. G., Stannard, W. H., Fearing, J. L., A system of remote control for an electric testing laboratory. B 13, 581 (1916-17) S291.
- Ahlborn, G. H., Data on electric railway track leakage. T 8, (1916-17) T75.
- Ahlborn, G. H., McCollum, B.:
Methods of making electrolysis surveys. T 3, (1911-16) T28.
Special studies in electrolysis mitigation. III. A report on conditions in Springfield, Ohio, with insulated feeder system installed. T 6, (1915-16) T54.
Influence of frequency of alternating or infrequently reversed current on electrolytic corrosion. T 7, (1916-17) T72.
- Aitchison, C. S., Ramberg, W., Tuckerman, L. B., Whittemore, H. L., Tensile and compressive properties of some stainless steel sheets. J 28, 499 (1942) RP1467.
- Aitchison, C. S., Tuckerman, L. B.:
An analysis of the deformation of the mooring spindle of the Shenandoah. T 18, 609 (1924-25) T270.
Design of specimens for short-time "fatigue" tests. T 19, 47 (1924-25) T275.
- Aldrich, E. W., Critical solution temperatures of mixtures of gasoline, n-propyl alcohol, and water. J 20, 9 (1938) RP1060.
- Aldrich, E. W., Bridgeman, O. C., Water tolerances of mixtures of gasoline with ethyl alcohol. J 20, 1 (1938) RP1059.
- Altrup, F. W., Vinal, G. W., Electromotive force of cells at low temperatures. S 17, 627 (1922) S434.
- Anderson, A. H., Herschel, W. H., Reclamation of used petroleum lubricating oils. T 17, 93 (1922-24) T223.
- Anderson, R. E., Kessler, D. W., Hockman, A., Physical properties of terrazzo aggregates. BMS98 (1943).
- Anderson, R. J., Fahlman, E. G.:
Development of a method for measurement of internal stress in brass tubing. T 18, 229 (1924-25) T257.
Release of internal stress in brass tubing. T 19, 235 (1924-25) T285.
- Anthes, G. P., Slater, W. A., Hagener, A., Test of a hollow tile and concrete floor slab reinforced in two directions. T 16, 727 (1921-22) T220.
- Appel, W. D., Becker, G., Evaluation of manila-rope fiber for color. J 11, 811 (1933) RP627.
- Appel, W. D., Jessup, D. A., Accelerated aging test for weighted silk. J 15, 601 (1935) RP855.
- Appel, W. D., Reed, R. F., Light fastness of lithographic ink pigments. J 3, 359 (1929) RP100.
- Appel, W. D., Schiefer, H. F., Hosiery testing machine. J 12, 543 (1934) RP679.
- Ash, E. J., Saege, Jr., C. M.:
A method for determining the volume changes occurring in metals during casting. J 8, 37 (1932) RP399.
Volume changes of cast irons during casting. J 8, 601 (1932) RP440.
Properties of gray cast iron as affected by casting conditions. J 13, 573 (1934) RP726.
- Ashley, H. E., The technical control of the colloidal matter of clays. T 3, (1911-16) T23.
- Ashton, F. W., Houston, D. F., Saylor, C. P., The optical properties, densities, and solubilities of the normal formates of some metals of group II of the periodic system. J 11, 233 (1933) RP587.
- Ashton, F. W., Lerch, W., Bogue, R. H., The sulphoaluminates of calcium. J 2, 715 (1929) RP54.
- Astbury, N. F., Curtis, H. L., Sparks, C. M., Hartshorn, L., Capacitance and power factor of a mica capacitor as measured at the Bureau of Standards and the National Physical Laboratory. J 8, 507 (1932) RP431.
- Astin, A. V.:
Measurement of relative and true power factors of air capacitors. J 21, 425 (1938) RP1138.
Nature of energy losses in air capacitors at low frequencies. J 22, 673 (1939) RP1212.
- Astin, A. V., Curtiss, L. F., Stockmann, L. L., Brown, B. W.:
An improved radio meteorograph on the Olland principle. J 22, 97 (1939) RP1169.
Cosmic-ray observations in the stratosphere with high-speed counters. J 23, 585 (1939) RP1254.
- Aston, J. G., Brickwedde, F. G., Moskow, M., Equilibrium constant of some reactions involved in the production of 1,3-butadiene. J 37, 263 (1946) RP1747.
- Austin, L. W.:
Detector for small alternating currents and electrical waves. B 1, 435 (1903-05) S22.
The positive charges carried by the canal rays. B 1, 439 (1903-05) S23.
On the platinum point electrolytic detector for electrical waves. B 2, 261 (1906) S36.
The production of high frequency oscillations from the electric arc. B 3, 325 (1907) S60.
Some contact rectifiers of electric currents. B 5, 133 (1908-09) S94.
A method for producing feebly damped high frequency electrical oscillations for laboratory measurements. B 5, 149 (1908-09) S95.
On the advantages of a high spark frequency in radio-telegraphy. B 5, 153 (1908-09) S96.
The comparative sensitiveness of some common detectors of electrical oscillations. B 6, 527 (1909-10) S140.
The measurement of electric oscillations in the receiving antenna. B 7, 295 (1911) S157.
Some experiments with coupled high-frequency circuits. B 7, 301 (1911) S158.
Some quantitative experiments in long distance radiotelegraphy. B 7, 315 (1911) S159.
Antenna resistance. B 9, 65 (1913) S189.
Energy losses in some condensers used in high-frequency circuits. B 9, 73 (1913) S190.
Quantitative experiments in radiotelegraphic transmission. B 11, 69 (1915) S226.
Note on the resistance of radiotelegraphic antennas. B 12, 465 (1915-16) S257.
- Austin, L. W., Guthe, K. E., Experiments on the Heusler magnetic alloys. B 2, 297 (1906) S38.
- Azilrod, B. M., Kline, G. M., Study of transparent plastics for use on aircraft. J 19, 367 (1937) RP1031.

B

- Babcock, H. D., Rosa, E. B., On the variation of resistances with atmospheric humidity. B 4, 121 (1907-08) S73.
- Back, E. A., Weber, C. G., Shaw, M. B., Effects of fumigants on paper. J 15, 271 (1935) RP828.
- Baden, A. L., Bibliography on standardization. M136 (1932).
- Bailey, H. W., Shepherd, M., An apparatus for the absorption or gravimetric determination of constituents of a gas mixture. J 26, 347 (1941) RP1381.
- Balcom, M. M., Gibson, K. S., Transmission measurements with the Beckman quartz spectro-photometer. J 38, 601 (1947) RP1798.

Ballif, P. S., Dryden, H. L.:

The characteristics of two-blade propeller fans. J 5, 185 (1930) RP193.

Further measurements of propeller fan characteristics. J 6, 387 (1931) RP283.

Ballif, P. S., Heald, R. H., Effect of yaw on vane anemometers. J 19, 685 (1937) RP1056.

Ballif, P. S., Ramberg, W., West, M. J., A method for determining stresses in a nonrotating propeller blade vibrating with a natural frequency. J 14, 189 (1935) RP764.

Barbrow, L. E., A photometric procedure using barrier-layer photocells. J 25, 703 (1940) RP1348.

Barbrow, L. E., Meyer, J. F., Characteristic equations of vacuum and gas-filled tungsten-filament lamps. J 9, 721 (1932) RP502.

Barbrow, L. E., Wensel, H. T., Roeser, W. F., Caldwell, F. R.:

The Waidner-Burgess standard of light. J 6, 1103 (1931) RP325.

Deviation of photometric standards for tungsten-filament lamps. J 13, 161 (1934) RP699.

Barrows, W. P., The spotting of plated or finished metals. J 2, 1085 (1929) RP72.

Barrows, W. P., Blum, W., Brenner, A., The porosity of electroplated chromium coatings. J 7, 697 (1931) RP368.

Barrows, W. P., Haring, H. E., Electrodeposition of chromium from chromic acid baths. T 21, 413 (1926-27) T346.

Barry, J. M., Sanford, R. L., Determination of the magnetic induction in sheet steel. S 21, 727 (1926-27) S545.

Barry, J. M., Sanford, R. L., Cheney, W. L., Effect of wear on the magnetic properties and tensile strength of steel wire. S 20, 339 (1924-26) S510.

Basil, J. L., Herschman, H. K.:

White-metal bearing alloys: Mechanical properties at different temperatures and service tests. J 10, 1 (1933) RP512.

"Tin-free" leaded bearing bronze. J 10, 591 (1933) RP551.

Basquin, O. H., Tangent modulus and the strength of steel columns in tests. T 18, 381 (1924-25) T263.

Bates, F.:

Spectrum lines as light sources in polariscopic measurements. B 2, 239 (1906) S34.

A quartz compensating polariscope with adjustable sensibility. B 4, 461 (1907-08) S86.

Remarks on the quartz compensating polariscope with adjustable sensibility. B 5, 193 (1908-09) S98.

A new cadmium vapor arc lamp. S 16, 45 (1920) S371.

Bates, R. G., Acree, S. F.:

pH values of certain phosphate-chloride mixtures and the second dissociation constant of phosphoric acid from 0° to 60° C. J 30, 129 (1943) RP1524.

Effect of sodium chloride on the pH of *p*-phenolsulfonate buffers from 0° to 60° C. J 32, 131 (1944) RP1580.

pH of aqueous mixtures of potassium dihydrogen phosphate and disodium hydrogen phosphate at 0° to 60° C. J 34, 373 (1945) RP1648.

Bates, F. J., Bearce, H. W., New Baumé scale for sugar solutions. T 11, (1918-19) T115.

Bates, F. J., Blake, J. C., The influence of basic lead acetate on the optical rotation of sucrose in water solution. B 3, 105 (1907) S52.

Bates, F. J., Isbell, H. S., Frush, H. L., Manufacture of calcium gluconate by the electrolytic oxidation of dextrose. J 8, 571 (1932) RP436.

Bates, F., Jackson, R. F., Constants of the quartz-wedge saccharimeter and the specific rotation of sucrose. I. The constants for the 26-gram normal weight. B 13, 67 (1916-17) S268.

Bates, F., Phelps, F. P.:

Influence of atmospheric conditions in the testing of sugars. B 10, 537 (1914) S221.

A suggested new base point on the thermometric scale and the α - β inversion of quartz. S 22, 315 (1927-28) S557.

The French sugar scale. J 17, 347 (1936) RP916.

Bates, R. G., Diamond, P. T., Eden, M., Acree, S. F., Salt effects of potassium nitrate, sodium sulfate and trisodium citrate on the activity coefficients

of *p*-phenolsulfonate buffers. J 37, 251 (1946) RP1746.

Bates, R. G., Edelstein, M., Acree, S. F., Reproducibility of the lead electrode and the electromotive force of the lead stick-lead amalgam cell at 0° to 60° C. J 36, 159 (1946) RP1697.

Bates, R. G., Hamer, W. J., Manov, G. G., Acree, S. F., Provisional pH values for certain standard buffer solutions. J 29, 183 (1942) RP1495.

Bates, R. G., Pinching, G. D., Purification of sodium chloride and potassium chloride for use in electrochemical work, and the determination of small amounts of bromide. J 37, 311 (1946) RP1749.

Bates, R. G., Siegel, G. L., Acree, S. F.:

Dissociation constants and pH-titration curves at constant ionic strength from electrometric titrations in cells without liquid junction: Titrations of formic acid and acetic acid. J 30, 347 (1943) RP1537.

The second dissociation constant of *p*-phenolsulfonic acid and pH values of phenolsulfonate-chloride buffers from 0° to 60° C. J 31, 205 (1943) RP1559.

Bates, P. H.:

The properties of portland cement having a high magnesia content. T 10, (1917-18) T102.

Cementing qualities of the calcium aluminates. T 15, (1921) T197.

Bates, P. H., Klein, A. A., Properties of the calcium silicates and calcium aluminate occurring in normal portland cement. T 8, (1916-17) T78.

Bates, P. H., Phillips, A. J., Wig, R. J., Action of the salts in alkali water and sea water on cements. T 2, (1912-14) T12.

Bates, P. H., Wig, R. J., Tests of the absorptive and permeable properties of portland cement mortars and concretes, together with tests of dampproofing and waterproofing compounds and materials. T 1, (1910-12) T3.

Bates, P. H., Young, R. N., Rapp, P., Tests of caustic magnesia made from magnesite from several sources. T 17, 529 (1922-24) T239.

Bates, S. J., Vinal, G. W., Comparison of the silver and iodine voltameters and the determination of the value of the Faraday. B 10, 425 (1914) S218.

Beal, A. F., Jewelers' and silversmiths' weights and measures. C43 (2d ed.), (1921).

Bean, H. S.:

An apparatus and method for determining the compressibility of a gas and the correction for "super-compressibility." J 4, 645 (1930) RP170.

Gas measuring instruments. C309 (1926).

Bean, H. S., Benesh, M. E., Buckingham, E., Experiments on metering of large volumes of air. J 7, 93 (1931) RP335.

Bean, H. S., Benesh, M. E., Witting, F. C.:

Joliet reference gas meter. J 17, 207 (1936) RP908.

Bean, H. S., Benesh, M. E., Whitting, F. C., Testing large-capacity rotary gas meters. J 37, 183 (1946) RP1741.

Bean, H. S., Buckingham, E., Murphy, P. S., Discharge coefficients of square-edged orifices for measuring the flow of air. J 2, 561 (1929) RP49.

Bearce, H. W.:

A fundamental basis for measurements of length. S 21, 395 (1926-27) S355.

The density and thermal expansion of linseed oil and turpentine. T 1, (1910-12) T9.

Graphic comparison of screw thread pitches. M49 (1922).

Bearce, H. W., Bates, F., New Baumé scale for sugar solutions. T 11, (1918-19) T115.

Bearce, H. W., Osborne, N. S., McKelvey, E. C., Density and thermal expansion of ethyl alcohol and of its mixtures with water. B 9, 327 (1913) S197.

Bearce, H. W., Pepper, E. L., Density and thermal expansion of American petroleum oils. T 8, (1916-17) T77.

Bebb, E. C., Wig, R. J., Williams, G. M., Finn, A. N., McCrory, S. H., Ferguson, L. R., Durability of cement drain tile and concrete in alkali soils. T 9, (1916-17) T95.

Bebb, E. C., Wig, R. J., Williams, G. M., McCrory, S. H., Ferguson, L. R., Investigation of the durability of cement drain tile in alkali soils. T 5, (1914-15) T44.

Becker, G., Spectral reflectance of the Philippine

- Island Government standards for abaca fiber. *J* 11, 823 (1933) RP628.
- Becker, G., Appel, W. D., Evaluation of manila-rope fiber for color. *J* 11, 627 (1933) RP627.
- Beckett, C. W., Rossini, F. D., Pilzer, K. S., Taylor, W. J., Kilpatrick, J. E., Ebert, J. P., Williams, M. G., Werner, H. G., Tables of selected values of hydrocarbons. C461 (1947).
- Beek, Jr., J.:
A study of the absorption of sulphuric acid by leather. *J* 5, 1109 (1930) RP249.
A contribution relative to the structure of collagen. *J* 8, 549 (1932) RP434.
Combining weight of collagen. *J* 14, 217 (1935) RP765.
Combination of hydrochloric acid and sodium hydroxide with hide, tendon, and bone collagen. *J* 21, 117 (1938) RP1119.
The carbohydrate content of collagen. *J* 27, 507 (1941) RP1438.
- Beek, Jr., J., Critchfield, C. L., A method for finding the roots of the equation $f(x)=0$ where f is analytic. *J* 14, 595 (1935) RP790.
- Beek, Jr., J., Sookne, A. M., Electrophoresis of collagen. *J* 23, 271 (1939) RP1230.
- Beek, Jr., J., Wallace, E. L., A comparison of the quinhydrone and hydrogen electrodes in solutions containing tannin. *J* 4, 737 (1930) RP176.
- Beek, Jr., J., Wallace, E. L., Critchfield, C. L.:
Effect of sulphuric acid on chrome-tanned leather. *J* 14, 771 (1935) RP802.
Influence of sulphonated cod-liver oil on the deterioration of vegetable-tanned leathers by sulphuric acid. *J* 15, 73 (1935) RP811.
- Beij, K. H.:
Corrosion of open-valley flashings. *J* 3, 937 (1929) RP123.
Seams for copper roofing. *J* 5, 585 (1930) RP216.
Flow in roof gutters. *J* 12, 193 (1934) RP644.
Pressure losses for fluid flow in 90° pipe bends. *J* 21, 1 (1938) RP1110.
- Beij, K. H., Keulegan, G. H., Pressure losses for fluid flow in curved pipes. *J* 18, 89 (1937) RP965.
- Bekkedahl, N., Forms of rubber as indicated by temperature-volume relationship. *J* 13, 411 (1934) RP717.
- Bekkedahl, N., Blum, W., Dimensional changes in the manufacture of electrotypes. *J* 6, 829 (1931) RP308.
- Bekkedahl, N., Matheson, H., Heat capacity, entropy, and free energy of rubber hydrocarbon. *J* 15, 503 (1935) RP844.
- Bekkedahl, N., McPherson, A. T., Heats of reaction of the system: rubber-sulphur. *J* 14, 601 (1935) RP791.
- Bekkedahl, N., Saffioti, W., Mangabeira latex and rubber. *J* 38, 427 (1947) RP1785.
- Bekkedahl, N., Scott, R. B., Specific heat of the synthetic rubber Hycar O. R. from 15° to 340° K. *J* 29, 87 (1942) RP1487.
- Bekkedahl, N., Scott, R. B., Meyers, C. H., Rands, Jr., R. D., Brickwedde, F. G., Thermodynamic properties of 1,3-butadiene in solid, liquid, and vapor states. *J* 35, 39 (1945) RP1661.
- Bekkedahl, N., Wood, L. A.:
Entropy of isoprene from heat-capacity measurements. *J* 19, 551 (1937) RP1044.
Crystallization of unvulcanized rubber at different temperatures. *J* 36, 489 (1946) RP1718.
- Bekkedahl, N., Wood, L. A., Gibson, R. E., Effect of pressure on the melting of crystalline rubber. *J* 35, 375 (1945) RP1677.
- Bekkedahl, N., Wood, L. A., Peters, C. G., Application of the interferometer to the measurement of dimensional changes in rubber. *J* 23, 571 (1939) RP1253.
- Bekkedahl, N., Wood, L. A., Roth, F. L., Measurement of densities of synthetic rubbers. *J* 29, 391 (1942) RP1507.
- Bekkedahl, N., Wood, L. A., Wojciechowski, Mieczyslaw, Some physical properties of isoprene. *J* 17, 883 (1936) RP951.
- Bell, R. K., Scherrer, A., Mogerman, W. D., Electroanalytical determination of copper and lead in nitric acid solution containing small amounts of hydrochloric acid. *J* 22, 697 (1939) RP1213.
- Benedict, F., Taylor, R. H., Wheeler, H. G., Jar rings for use in home canning; their testing and a proposed specification. M181 (1945).
- Benesh, M. E., Bean, H. S., Buckingham, E., Experiments on metering of large volumes of air. *J* 7, 93 (1931) RP335.
- Benesh, M. E., Bean, H. S., Witting, F. C.:
Joliet reference gas meter. *J* 17, 207 (1936) RP907.
Testing large-capacity rotary gas meters. *J* 37, 183 (1946) RP1741.
- Bennett, A. H.:
Aberrations of long focus anastigmatic photographic objectives. *S* 19, 587 (1923-24) S494.
An interference method for determination of axial and oblique aberrations. *J* 2, 685 (1929) RP52.
Representation of aberration diffraction effects by means of rotating sectors. *J* 3, 391 (1929) RP102.
- Bennett, A. H., Smith, T. T., Merritt, G. E., Characteristics of striae in optical glass. *S* 16, 75 (1920) S373.
- Bennett, E. G., Sanford, R. L.:
An apparatus for magnetic testing at high magnetic forces. *J* 10, 567 (1933) RP548.
Determination of magnetic hysteresis with the Fahy Simplex permeameter. *J* 15, 517 (1935) RP845.
An apparatus for magnetic testing at magnetizing forces up to 5,000 oersteds. *J* 23, 415 (1939) RP1242.
A determination of the magnetic saturation induction of iron at room temperature. *J* 26, 1 (1941) RP1354.
- Bennett, H. F., The reciprocal spherical aberration of an optical system including higher orders. *J* 9, 187 (1932) RP466.
- Bennett, J. A., A study of the damaging effect of fatigue stressing on SAE X4130 steel. *J* 37, 123 (1946) RP1733.
- Bennett, J. A., McAdam, Jr., D. J., Creep rates of cold-drawn nickel-copper alloy (monel metal). *J* 28, 417 (1942) RP1462.
- Berglund, T., Rawdon, H. S., Unusual features in the microstructure of ferrite. *S* 22, 649 (1927-28) S571.
- Berkner, L. V., Some studies of radio transmission over long paths made on the Byrd Antarctic expedition. *J* 8, 265 (1932) RP412.
- Berkner, L. V., Kirby, S. S., Gilliland, T. R., Norton, K. A., Radio observations of the Bureau of Standards during the solar eclipse of August 31, 1932. *J* 11, 829 (1933) RP629.
- Berkner, L. V., Kirby, S. S., Stuart, D. M., Studies of the ionosphere and their application to radio transmission. *J* 12, 15 (1934) RP632.
- Berliner, J. F. T., Preparation and properties of pure iron alloys. IV. Determination of the critical ranges of pure iron-carbon alloys by the thermoelectric method. *S* 19, 347 (1923-24) S484.
- Berry, W. J., Freeman, Jr., J. R., Dowdell, R. L., Endurance and other properties of rail steel. *T* 22, 269 (1927-28) T363.
- Berry, W. M., Brumbaugh, I. V., Eiseaman, J. H., Moulton, G. F., Shawn, G. B., Relative usefulness of gases of different heating value and adjustments of burners for changes in heating value and specific gravity. *T* 17, 15 (1922-24) T222.
- Berry, W. M., Brumbaugh, I. V., Moulton, G. F., Shawn, G. B., Design of atmospheric gas burners. *T* 15, (1921) T193.
- Berry, W. M., McBride, R. S., Tests of flexible gas tubing. *T* 12, (1919) T133.
- Best, A. S., Schiefer, H. F.:
A portable instrument for measuring air permeability of fabrics. *J* 6, 51 (1931) RP261.
Carpet wear testing machine. *J* 6, 927 (1931) RP315.
- Bibber, L. C., Ellinger, G. A., Laboratory corrosion tests of welded low-carbon stainless steel. *J* 18, 69 (1937) RP963.
- Bicking, G. W., Hamill, G. K., Gottschalk, V. H., Use of glue in coated paper. *T* 20, 635 (1925-26) T323.
- Bicking, G. W., Rasch, R. H., Shaw, M. B.:
Highly purified wood fibers as paper-making material. *J* 7, 765 (1931) RP372.
A study of some factors influencing the strength and stability of experimental papers made from two different sulphite pulps. *J* 11, 7 (1933) RP574.
- Bicking, G. W., Shaw, M. B.:
Comparison of American and foreign clays as paper fillers. *T* 18, 337 (1924-25) T262.

- A comparative study of paper fillers. *T 19*, 733 (1924-25) T301.
- Research on the production of currency paper in the Bureau of Standards experimental paper mill. *T 21*, 89 (1926-27) T329.
- Carao fiber as a paper-making material. *T 21*, 323 (1926-27) T340.
- Further experimental production of currency paper in the Bureau of Standards paper mill. *J 3*, 899 (1929) RP121.
- Rayon as a paper-making material. *J 4*, 203 (1930) RP143.
- Bicking, G. W., Shaw, M. B., O'Leary, M. J.:*
Further study of paper-coating minerals and adhesives. *J 5*, 1189 (1930) RP254.
The paper-making properties of phormium tenax (New Zealand flax). *J 6*, 411 (1931) RP285.
- A study of the relation of some properties of cotton rags to the strength and stability of experimental papers made from them. *J 14*, 649 (1935) RP794.
- Bicking, G. W., Shaw, M. B., Snyder, L. W.,* The preparation of fiber test sheets. *J 5*, 105 (1930) RP190.
- Bicking, G. W., Shaw, M. B., Strieter, O. G.,* Experimental production of roofing felts. *J 2*, 1001 (1929) RP67.
- Bingham, E. C.:*
An investigation of the laws of plastic flow. *B 13*, 309 (1916-17) S278.
Cutting fluids. *T 16*, 35 (1921-22) T204.
- Bingham, E. C., Jackson, R. F.,* Standard substances for the calibration of viscometers. *B 14*, 59 (1918-19) S298.
- Bishop, D. L.:*
A sedimentation method for the determination of the particle size of finely divided materials (such as hydrated lime). *J 12*, 173 (1934) RP642.
Particle size and plasticity of lime. *J 23*, 285 (1939) RP1232.
Function of carbon dioxide in producing efflorescence on plaster and cement products. *J 30*, 361 (1943) RP1538.
- Bishop, D. L., Flint, E. P., Clarke, W. F., Newman, E. S., Shartsis, L., Wells, L. S.,* Extraction of alumina from clays and high-silica bauxites. *J 36*, 63 (1946) RP1691.
- Bishop, D. L., Wells, L. S., Watstein, D.,* Differences in limes as reflected in certain properties of masonry mortars. *J 17*, 895 (1936) RP952.
- Bissell, A. G., Ellinger, G. A., Williams, M. L.,* The tee-bend test to compare the welding quality of steels. *J 28*, 1 (1942) RP1444.
- Bitner, F. G., Bulkley, R.:*
A new consistometer and its application to greases and to oils at low temperatures. *J 5*, 83 (1930) RP188.
Surface tension of soap solutions and its relation to the thickness of absorbed films. *J 5*, 951 (1930) RP241.
- Blackburn, G. F., Peters, M. F., Hannen, P. T.:*
Theory of voltage dividers and their use with cathode ray oscillographs. *J 9*, 81 (1932) RP460.
Electrical character of the spark discharge of automotive ignition systems. *J 19*, 401 (1937) RP1032.
- Blaine, R. L.,* Ten-year tests on commercial masonry cements. *J 31*, 45 (1943) RP1548.
- Blaine, R. L., Newman, E. S., Jumper, C. H., Kalousek, G. L.,* Effects of added materials on some properties of hydrating portland cement clinkers. *J 30*, 281 (1943) RP1533.
- Blaine, R. L., Rogers, J. S.,* Investigation of commercial masonry cements. *J 13*, 811 (1934) RP746.
- Blaine, R. L., Rucker, Jr., J.,* Application of vibrators for measuring mortar consistency and fabricating mortar cubes. *J 24*, 103 (1940) RP1273.
- Blair, M. G., Peffer, E. L.:*
Thermal density coefficients and hydrometer correction tables for vegetable tanning extracts. *J 33*, 341, (1944) RP1612.
Hydrometer correction tables and thermal density coefficients for vegetable tanning extracts. C449 (1945).
- Blair, M. G., Hidnerl, P.,* Thermal expansivity and density of indium. *J 30*, 427 (1943) RP1541.
- Blake, J. C., Bates, F. J.,* The influence of basic lead acetate on the optical rotation of sucrose in water solution. *B 3*, 105 (1907) S52.
- Blanchard, M. S., Pickering, S. F.,* A review of the literature relating to the normal densities of gases. *S 21*, 141 (1926-27) S529.
- Blackney, W. M.,* Compensation of strain gages for vibration and impact. *J 18*, 723 (1937) RP1005.
- Bleiminger, A. V.:*
The effect of preliminary heating treatment upon the drying of clays. *B 7*, 143 (1911) S151.
Effect of preliminary heat treatment upon the drying of clays. *T 1*, (1910-12) T1.
Use of sodium salts in the purification of clays and in the casting process. *T 5*, (1914-15) T51.
The properties of American bond clays and their use in graphite crucibles and glass pots. *T 13*, (1919-20) T144.
- Bleiminger, A. V., Brown, G. H.:*
The testing of clay refractories, with special reference to their load carrying ability at furnace temperatures. *T 1*, (1910-12) T7.
The veritas firing rings. *T 4*, (1913-14) T40.
- Bleiminger, A. V., Kinnison, C. S.,* Viscosity of porcelain bodies high in feldspar. *T 5*, (1914-15) T50.
- Bleiminger, A. V., Montgomery, E. T.,* The effect of overfiring upon the structure of clays. *T 3*, (1911-16) T22.
- Bleiminger, A. V., Schurecht, H. G.,* Properties of some European plastic fire clays. *T 8*, (1916-17) T79.
- Bleiminger, A. V., Teetor, P.,* Viscosity of porcelain bodies. *T 3*, (1911-16) T30.
- Blum, W.:*
The hydrolysis of sodium oxalate and its influence upon the test for neutrality. *B 8*, 519 (1912) S178.
Determination of manganese as sulphate and by the sodium bismuthate method. *B 8*, 715 (1912) S186.
Determination of aluminum as oxide. *B 13*, 515 (1916-17) S286.
- Blum, W., Barrows, W. P., Brenner, A.,* The porosity of electroplated chromium coatings. *J 7*, 697 (1931) RP368.
- Blum, W., Bekkedahl, N.,* Dimensional changes in the manufacture of electrotypes. *J 6*, 829 (1931) RP308.
- Blum, W., Brenner, A.,* Mesle's chord method for measuring the thickness of metal coatings. *J 16*, 171 (1936) RP866.
- Blum, W., Farber, H. L.,* Throwing power in chromium plating. *J 4*, 27 (1930) RP131.
- Blum, W., Hull, R. O.,* Addition agents in copper electrotyping solutions. *J 5*, 767 (1930) RP228.
- Blum, W., Liscomb, F. J., Carson, C. M.,* Zinc cyanide plating solutions. *T 15*, (1921) T195.
- Blum, W., Luz, G. A.,* Methods of polishing steel and their effects upon the protective value of electroplated coatings. *J 34*, 295 (1945) RP1645.
- Blum, W., Moore, H. R.,* Conductivity and density of chromic acid solutions. *J 5*, 255 (1930) RP198.
- Blum, W., Strausser, P. W. C.,* Outdoor exposure tests of electroplated nickel and chromium coatings on steel and nonferrous metals. *J 24*, 443 (1940) RP1293.
- Blum, W., Strausser, P. W. C., Brenner, A.:*
Protective value of nickel and chromium plating on steel. *J 13*, 331 (1934) RP712.
Accelerated tests of nickel and chromium plating on steel. *J 13*, 519 (1934) RP724.
Corrosion-protective value of electro-deposited zinc and cadmium coatings on steel. *J 16*, 185 (1936) RP867.
- Boeckner, C.:*
Resonance and quenching of the third principal series line of caesium. *J 5*, 13 (1930) RP184.
Probabilities of recombination into the 1S state of caesium. *J 6*, 277 (1931) RP274.
Radiation from caesium and other metals bombarded by slow electrons. *J 9*, 413 (1932) RP478.
The variation with angle of emission of the radiation from metals bombarded by slow electrons. *J 9*, 583 (1932) RP493.
- Boeckner, C., Mohler, F. L.:*
Recombination spectra of ions and electrons in caesium and helium. *J 2*, 489 (1929) RP46.

- Photoionization of some alkali vapors. J 3, 303 (1929) RP96.
- Photo-ionization of caesium by line absorption. J 5, 51 (1930) RP186.
- Effects of gases on photo-ionization of caesium by line absorption. J 5, 399 (1930) RP208.
- Photo-ionization of caesium vapor by absorption between the series lines. J 5, 831 (1930) RP234.
- Radiation from metals bombarded by low-speed electrons. J 6, 673 (1931) RP297.
- Radiation from probe surfaces bombarded by electrons. J 7, 751 (1931) RP371.
- Scattering of electrons by ions and the mobility of electrons in a caesium discharge. J 10, 357 (1933) RP535.
- Bogan, J. A., Proffitt, M. J., Jackson, R. F.:**
Dimensions of jerusalem-artichoke cosettes. J 17, 615 (1936) RP931.
- Extraction of jerusalem-artichoke juices in an experimental diffusion battery. J 19, 263 (1937) RP1025.
- Bogaty, H., Carson, F. T.,** Measurement of rate of flow of water through filter paper. J 33, 353, (1944) RP1613.
- Bogaty, H., Jessup, D. A., Weiseberg, S. G.,** Properties and performance of fiber tile boards. BMS77 (1941).
- Bogue, R. H., Brownmiller, L. T.:**
The X-ray method applied to a study of the constitution of Portland cement. J 5, 813 (1930) RP233.
- System $\text{CaO}-\text{Na}_2\text{O}-\text{Al}_2\text{O}_3$. J 8, 289 (1932) RP414.
- Bogue, R. H., Greene, K. T.,** Phase equilibrium relations in a portion of the system $\text{Na}_2\text{O}-\text{CaO}-\text{Al}_2\text{O}_3-\text{SiO}_2$. J 36, 185 (1946) RP1699.
- Bogue, R. H., Lerch, W.,** Heat of hydration of portland cement pastes. J 12, 645 (1934) RP684.
- Bogue, R. H., Lerch, W., Ashton, F. W.,** The sulphoaluminates of calcium. J 2, 715 (1929) RP54.
- Boone, C. E., Spence, D.,** Some vulcanization tests of guayule rubber. T 22, 1 (1927-28) T353.
- Borkowski, G., Wilson, B. L., Tate, D. R.:**
Dead-weight machines of 111,000- and 10,100-pound capacities, C446 (1943).
- Temperature coefficients for proving rings. J 37, 35 (1946) RP1726.
- Proving rings for calibrating testing machines. C454 (1946).
- Boughton, E. W.:**
Determination of oil and resin in varnish. T 7, (1916-17) T65.
- Detection of resin in drier. T 7, (1916-17) T66.
- Effect of certain pigments on linseed oil. T 7, (1916-17) T71.
- Determination of volatile thinner in oil varnish. T 8, (1916-17) T76.
- Boutell, H. G.:**
Visitors' manual of the National Bureau of Standards. M93 (1929).
- Visitors' manual of the Bureau of Standards. M134 (1932).
- Visitors' manual of the National Bureau of Standards. M153 (1935).
- Visitors' manual of the National Bureau of Standards. M160 (1937).
- Bovard, W. M., Vinal, G. W.,** Inclusions in the silver voltameter deposits. B 13, 147 (1916-17) S271.
- Bower, J. H.:**
Comparative efficiencies of various dehydrating agents used for drying gases (a survey of commercial drying agents). J 12, 241 (1934) RP649.
- Revised results obtained with certain dehydrating agents used for drying gases. J 33, 199 (1944) RP1603.
- Bowker, R. C.:**
Durability of sole leather filled with sulphite cellulose extract. T 16, 495 (1921-22) T215.
- Shoe constructions. C419 (1938).
- Bowker, R. C., Churchill, J. B.,** Effects of oils, greases, and degree of tannage on the physical properties of russet harness leather. T 6, (1915-16) T160.
- Bowker, R. C., Emley, W. E.,** Comparative wear of chrome-tanned, vegetable-tanned, and retanned sole leather. J 15, 363 (1935) RP834.
- Bowker, R. C., Geib, M. N. V.,** Comparative durability of chrome and vegetable tanned sole leathers. T 19, 267 (1924-25) T286.
- Bowker, R. C., Hart, R. W.,** An apparatus for measuring the relative wear of sole leathers and the results obtained with leather from the different parts of a hide. T 13, (1919-20) T147.
- Bowker, R. C., Wallace, E. L.:**
Use of sulphite cellulose extract as a tanning material. T 21, 309 (1926-27) T339.
- The influence of pH on the deterioration of vegetable-tanned leather by sulphuric acid. J 10, 559 (1933) RP547.
- Bowker, R. C., Wallace, E. L., Kanagy, J. R.,** Influence of magnesium sulphate on the deterioration of vegetable-tanned leather by sulphuric acid. J 14, 121 (1935) RP761.
- Bowker, R. C., Wormeley, P. L., Hart, R. W., Whitmore, L. M., Churchill, J. B.,** Effects of glucose and salts on the wearing quality of sole leather. T 12, (1919) T138.
- Boyd, H. S., Peters, C. G.,** Interference methods for standardizing and testing precision gage blocks. S 17, 677 (1922) S436.
- Boyd, J. E.,** Investigation of the compressive strength of spruce struts of rectangular cross section and the derivation of formulas suitable for use in airplane design. T 13, (1919-20) T152.
- Boyden, R. C., Schoffstall, C. W.,** Development of a standard bending test for rope yarns. T 19, 723 (1924-25) T300.
- Boydland, P. M., Schiefer, H. F.:**
Improved instrument for measuring the air permeability of fabrics. J 28, 637 (1942) RP1471.
- Note on flexural fatigue of textiles. J 29, 69 (1942) RP1485.
- Boydland, P. M., Schiefer, H. F., Stevens, H. T., Mack, P. B.,** A study of the properties of household blankets. J 32, 261 (1944) RP1589.
- Bradt, P., Brewer, A. K., Madorsky, S. L., Taylor, J. K., Dibeler, V. H., Parham, O. L., Britten, R. J., Reid, Jr., J. G.,** Concentration of isotopes of potassium by the counter-current electromigration method. J 38, 137 (1947) RP1765.
- Braestrup, C. B., Wyckoff, H. O., Singer, G.,** Absorption measurements for broad beams of 1- and 2-million-volt X-rays. J 37, 147 (1946) RP1735.
- Bragg, J. G.,** The compressive strength of large brick piers. T 11, (1918-19) T111.
- Bragg, J. G., Griffith, J. H.:**
Tests of large bridge columns. T 10, (1917-18) T101.
- Strength and other properties of wire rope. T 12, (1919) T121.
- Bragg, J. G., Tucker, Jr., J.,** Tests of eighteen concrete columns reinforced with cast iron. T 12, (1919) T122.
- Braham, J. M., Holler, H. D.,** The cadmium electrode for storage battery testing. T 13, (1919-20) T146.
- Brandt, P. F., Freeman, Jr., J. R., Sillers, Jr., F.,** Pure zinc at normal and elevated temperatures. S 20, 661 (1924-26) S522.
- Branham, J. R.:**
Errors in gas analysis arising from loss of gas by solution in rubber connections and stopcock lubricant. J 12, 353 (1934) RP661.
- Saturation by water in gas analysis compensators. J 18, 59 (1937) RP962.
- Preparation and application of chromous solutions for the absorption of oxygen in volumetric gas analysis. J 21, 45 (1938) RP1112.
- Branham, J. R., Shepherd, M.:**
Critical study of the determination of ethane by combustion over platinum in the presence of excess oxygen. J 11, 783 (1933) RP625.
- Critical study of the determination of ethane by explosion with oxygen or air. J 13, 377 (1934) RP715.
- Gasometric method and apparatus for the analysis of mixtures of ethylene oxide and carbon dioxide. J 22, 171 (1939) RP1175.
- Branham, J. R., Shepherd, M., Schuhmann, S.,** Critical study of the determination of carbon monoxide by combustion over platinum in the presence of excess oxygen. J 26, 571 (1941) RP1396.
- Branham, J. R., Sperling, E. O.,** Bubbler tip of Pyrex glass for difficult absorptions. J 22, 701 (1939) RP1214.

- Branham, J. R., Sucher, M., Displacement of nitrogen from and its solution in certain reagents during volumetric gas analysis. *J* 21, 63 (1938) RP1113.
- Brattain, W. H., Heaton, V. E., Design of a portable temperature-controlled piezo oscillator. *J* 4, 345 (1930) RP153.
- Brauns, D. H.:
Optical rotation and atomic dimensions-halo-geno-tetra-acetyl derivatives of mannose. Their configurational peculiarities. *J* 7, 573 (1931) RP358.
Empirical relation between the atomic dimensions and the melting and sublimation points of the noble gases, halogens, and elements of the sulphur group. *J* 17, 337 (1936) RP915.
Optical rotation and atomic dimension for the four optically active 1-halogeno-2-methylbutanes. *J* 18, 315 (1937) RP978.
Quantitative determination of fluorine in organic compounds. *J* 27, 105 (1941) RP1406.
Optical rotation and atomic dimensions: The four optically active 2-halogenopentanes. *J* 31, 83 (1943) RP1551.
- Brauns, D. H., Frush, H. L., Application of the fluorating process to fructose. *J* 6, 449 (1931) RP287.
- Breckenridge, F. C., Nolan, J. E., Relative visibility of luminous flashes from neon lamps and from incandescent lamps with and without red filters. *J* 3, 11 (1929) RP78.
- Breit, G.:
Some effects of the distributed capacity between inductance coils and the ground. *S* 17, 521 (1922) S427.
High-frequency resistance of inductance coils. *S* 17, 569 (1922) S430.
The field radiated from two horizontal coils. *S* 17, 589 (1922) S431.
- Brenner, A.:
Magnetic method for measuring the thickness of nickel coatings on nonmagnetic base metals. *J* 18, 565 (1937) RP994.
Magnetic method for measuring the thickness of nonmagnetic coatings on iron and steel. *J* 20, 357 (1938) RP1081.
Dropping tests for measuring the thickness of zinc and cadmium coatings on steel. *J* 23, 387 (1939) RP1240.
- Brenner, A., Blum, W., Mesle's chord method for measuring the thickness of metal coatings. *J* 16, 171 (1936) RP866.
- Brenner, A., Blum, W., Barrows, W. P., The porosity of electroplated chromium coatings. *J* 7, 697 (1931) RP368.
- Brenner, A., Blum, W., Strausser, P. W. C.:
Protective value of nickel and chromium plating on steel. *J* 13, 331 (1934) RP712.
Corrosion-protective value of electro-deposited zinc and cadmium coatings on steel. *J* 16, 185 (1936) RP867.
- Brenner, A., Riddell, G. E., Nickel plating on steel by chemical reduction. *J* 37, 31 (1946) RP1725.
- Brenner, A., Strausser, P. W. C., Blum, W., Accelerated tests of nickel and chromium plating on steel. *J* 13, 519 (1934) RP724.
- Brewer, A. K., Dibeler, V. H., Mass spectrometric analyses of hydrocarbon and gas mixtures. *J* 35, 125 (1945) RP1664.
- Brewer, A. K., Madorsky, S. L., Concentration of the isotopes of mercury by free evaporation in a 10-cell counter-current reflux still. *J* 38, 129 (1947) RP1764.
- Brewer, A. K., Madorsky, S. L., Taylor, J. K., Dibeler, V. H., Bradt, P., Parham, O. L., Britten, R. J., Reid, Jr., J. G., Concentration of isotopes of potassium by the counter-current electromigration method. *J* 38, 137 (1947) RP1765.
- Brewster, J. F., Simplified apparatus for technical sugar colorimetry. *J* 16, 349 (1936) RP878.
- Brewster, J. F., Phelps, F. P., The preparation of optically stable sugar solutions for colorimetric analysis. *J* 10, 365 (1933) RP536.
- Brickwedde, F. G., Hoge, H. J.:
Establishment of a temperature scale for the calibration of thermometers between 14° and 83° K. *J* 22, 351 (1939) RP1188.
Intercomparison of platinum resistance thermometers between -190° and 445° C. *J* 28, 217 (1942) RP1454.
- Brickwedde, F. G., Moskow, M., Aston, J. G., Equilibrium constant of some reactions involved in the production of 1,3-butadiene. *J* 37, 263 (1946) RP1747.
- Brickwedde, F. G., Priest, I. G., Judd, D. B., Minimum perceptible colorimetric purity as a function of dominant wave length. *J* 20, 673 (1938) RP1099.
- Brickwedde, F. G., Scott, R. B.:
A precision cryostat with automatic temperature regulation. *J* 6, 401 (1931) RP284.
Molecular volumes and expansivities of liquid normal hydrogen and parahydrogen. *J* 19, 237 (1937) RP1023.
Thermodynamic properties of solid and liquid ethylbenzene from 0° to 300° K. *J* 35, 539 (1945) RP1684.
- Brickwedde, F. G., Scott, R. B., Cook, J. W., Silvering and evacuating pyrex Dewar flasks. *J* 7, 935 (1931) RP385.
- Brickwedde, F. G., Scott, R. B., Ferguson, W. J., Thermodynamic properties of *cis*-2-butene from 15° to 1,500° K. *J* 33, 1, (1944) RP1592.
- Brickwedde, F. G., Scott, R. B., Meyers, C. H., Rands, Jr., R. D., Bekkedahl, N., Thermodynamic properties of 1,3-butadiene in the solid, liquid, and vapor states. *J* 35, 39 (1945) RP1661.
- Brickwedde, F. G., Scott, R. B., Taylor, H. S., The difference in vapor pressures of ortho- and para-deuterium. *J* 15, 463 (1935) RP841.
- Brickwedde, F. G., Silsbee, F. B., Scott, R. B.:
A new phenomenon in the super-conducting transition of tantalum and of tin. *J* 18, 295 (1937) RP977.
Some experiments at radio frequencies on superconductors. *J* 20, 109 (1938) RP1070.
- Brickwedde, L. H., Solubility of cadmium sulfate in H₂O-D₂O mixtures. *J* 36, 377 (1946) RP1707.
- Brickwedde, L. H., Vinal, G. W.:
Electromotive force of saturated Weston standard cells containing deuterium oxide. *J* 20, 599 (1938) RP1094.
Metastability of cadmium sulfate and its effect on electromotive force of saturated standard cells. *J* 26, 455 (1941) RP1389.
Relation of electromotive force to the concentration of deuterium oxide in saturated standard cells. *J* 27, 479 (1941) RP1435.
- Bridgeman, O. C., Equilibrium volatility of motor fuels from the standpoint of their use in internal combustion engines. *J* 13, 53 (1934) RP694.
- Bridgeman, O. C., Aldrich, E. W., Water tolerances of mixtures of gasoline with ethyl alcohol. *J* 20, 1 (1938) RP1059.
- Bridgeman, O. C., Quersfeld, D. W.:
Critical solution temperatures of mixtures of gasoline, ethyl alcohol, and water. *J* 10, 693 (1933) RP560.
The effect of gasoline volatility on the miscibility with ethyl alcohol. *J* 10, 841 (1933) RP571.
- Briggs, C. A., Gordon, E. D.:
Method for precision test of large capacity scales. *T* 15, (1921) T199.
Weighing by substitution. *T* 16, 177 (1921-22) T208.
- Briggs, C. A., Wolff, F. A., Schoemaker, M. P., Construction of primary mercurial resistance standards. *B* 12, 375 (1915-16) S256.
- Briggs, L. J., Methods for measuring the coefficient of restitution and the spin of a ball. *J* 34, 1 (1945) RP1624.
- Bright, H. A.:
Determination of small amounts of zinc in steels and irons. *J* 12, 383 (1934) RP664.
Determination of sulphur occurring as sulphide in portland cement. *J* 18, 137 (1937) RP968.
Use of arsenious oxide in the standardization of solutions of potassium permanganate. *J* 19, 691 (1937) RP1057.
Analytical methods employed in the analysis of high-purity iron. Determinations of carbon, sulfur, phosphorus, and copper. Appendix to *J* 23, 175 (1939) RP1226.
- Bright, H. A., Fowler, R. M.:
Determination of aluminum in nitriding steels by the use of 8-hydroxyquinoline. *J* 10, 327 (1933) RP533.
Standardization of permanganate solutions with sodium oxalate. *J* 15, 493 (1935) RP843.

- Bright, H. A., Hague, J. L.:**
Determination of boron in steel and cast iron. J 21, 125 (1938) RP1120.
Colorimetric determination of phosphorus in steel and cast iron. J 26, 405 (1941) RP1386.
- Bright, H. A., Larrabee, C. P.,** Determination of manganese in steel and iron by the persulphate-arsenite method. J 3, 573 (1929) RP109.
- Bright, H. A., Lundell, G. E. F.,** Determination of carbon in high sulphur steels by direct combustion. J 5, 943 (1930) RP240.
- Bright, H. A., Redmond, J. C.,** Determination of magnesium in Portland cement and similar materials by the use of 8-hydroxyquinoline. J 6, 113 (1931) RP265.
- Bright, H. A., Thompson, J. G., Vacher, H. C.,** Cooperative study of methods for the determination of oxygen in steel. J 18, 259 (1937) RP976.
- Britten, R. J., Brewer, A. K., Madorsky, S. L., Taylor, J. K., Dibeler, V. H., Bradt, P., Parham, O. L., Reid, Jr., J. G.,** Concentration of isotopes of potassium by the counter-current electromigration method. J 38, 137 (1947) RP1765.
- Brode, W. R.,** The spectral absorption of certain monoazo dyes. I. The effect of position isomerism on the spectral absorption of methyl derivatives of benzeneazophenol. J 2, 501 (1929) RP47.
- Brode, W. R., Scribner, B. W.,** A modified method for determination of the copper number of paper. T 22, 9 (1927-28) T354.
- Brombacher, W. G.,** Standard atmosphere chart. M82 (1927).
- Brombacher, W. G., Goerke, V. H., Cordero, F.,** Sensitive aneroid diaphragm capsule with no deflection above a selected pressure. J 24, 31 (1940) RP1270.
- Brooks, D. B.:**
Correcting engine tests for humidity. J 3, 795 (1929) RP118.
Properties of purified normal heptane and isooctane (2, 2, 4-trimethylpentane). J 21, 847 (1938) RP1160.
Effect of altitude on knock rating of CFR engines. J 28, 713 (1942) RP1475.
Single-cylinder-engine tests of substitute motor fuels. J 35, 1 (1945) RP1660.
An analysis of the effects of fuel distribution on engine performance. J 36, 425 (1946) RP1712.
Psychrometric charts. M143 (1933).
Psychrometric charts for high and low pressures. M146 (1935).
- Brooks, D. B., Cleaton, R. B., Carter, F. R.,** Paraffin hydrocarbons isolated from crude synthetic isooctane (2, 2, 4-trimethylpentane). J 19, 319 (1937) RP1027.
- Brooks, D. B., Howard, F. L., Crafton, Jr., H. C.:**
Physical properties of purified 2, 2, 3-trimethylpentane. J 23, 637 (1939) RP1259.
Physical properties of some purified aliphatic hydrocarbons. J 24, 33 (1940) RP1271.
- Brooks, D. B., Howard, F. L., Mears, T. W., Fookson, A., Pomerantz, P.,** Preparation and physical properties of several aliphatic hydrocarbons and intermediates. J 38, 365 (1947) RP1779.
- Brooks, H. B.:**
A new potentiometer for the measurement of electromotive force and current. B 2, 225 (1906) S33.
A deflection potentiometer for voltmeter testing. B 4, 275 (1907-08) S79.
Deflection potentiometers for current and voltage measurements. B 8, 395 (1912) S172.
Outline of design of deflection potentiometers, with notes on the design of moving-coil galvanometers. B 8, 419 (1912) S173.
Testing potential transformers. B 10, 419 (1914) S217.
Sensitivity of a galvanometer as a function of its resistance. J 4, 297 (1930) RP150.
Design of standards of inductance, and the proposed use of models in the design of air-core and iron-core reactors. J 7, 289 (1931) RP342.
The standard-cell comparator, a specialized potentiometer. J 11, 211 (1933) RP586.
Temperature compensation of millivoltmeters. J 17, 497 (1936) RP926.
Information for the amateur designer of transformers for 25- to 60-cycle circuits. C408 (1935).
- Brooks, H. B., Defandorf, F. M.,** An experimental study of the corona voltmeter. J 1, 589 (1928) RP21.
- Brooks, H. B., Defandorf, F. M., Silsbee, F. B.,** An absolute electrometer for the measurement of high alternating voltages. J 20, 253 (1938) RP1078.
- Brooks, H. B., Hyde, E. P.,** An efficiency meter for electric incandescent lamps. B 2, 145 (1906) S30.
- Brooks, H. B., Lewis, A. B.,** Improved continuously variable self and mutual inductor. J 19, 493 (1937) RP1040.
- Brooks, H. B., Rosa, E. B., McCollum, B., Canada, W. J., Glading, F. W.,** Investigation of cartridge-inclosed fuses. T 8, (1916-17) T74.
- Brooks, H. B., Spinks, A. W.,** A multi-range potentiometer and its application to the measurement of small temperature differences. J 9, 781 (1932) RP506.
- Brooks, H. B., Tuckerman, L. B., Dryden, H. L.,** A method of exciting resonant vibrations in mechanical systems. J 10, 659 (1933) RP556.
- Brooks, H. B., Weaver, F. C.,** A variable self and mutual inductor. B 13, 569 (1916-17) S290.
- Brown, B. W., Curtiss, L. F.:**
Frequency meter for use with Geiger-Müller counter. J 34, 53 (1945) RP1627.
Thin-walled aluminum beta-ray tube counters. J 35, 147 (1945) RP1666.
An arrangement with small solid angle for measurement of beta rays. J 37, 91 (1946) RP1731.
- Brown, B. W., Curtiss, L. F., Astin, A. V., Stockmann, L. L.:**
An improved radio meteorograph on the Olland principle. J 22, 97 (1939) RP1169.
Cosmic-ray observations in the stratosphere with high-speed counters. J 23, 585 (1939) RP1254.
- Brown, C. R.,** Fire tests of treated and untreated wood partitions. J 20, 217 (1938) RP1076.
- Brown, G. H., Bleininger, A. V.:**
The testing of clay refractories, with special reference to their load carrying ability at furnace temperatures. T 1, (1910-12) T7.
The veritas firing rings. T 4, (1913-14) T40.
- Brown, G. H., Montgomery, E. T.,** The dehydration of clays. T 3, (1911-16) T21.
- Brown, G. H., Murray, G. A.,** The function of time in the vitrification of clays. T 2, (1912-14) T17.
- Brownmiller, L. T., Bogue, R. H.:**
The X-ray method applied to a study of the constitution of Portland cement. J 5, 813 (1930) RP233.
System $\text{CaO-Na}_2\text{O-Al}_2\text{O}_3$. J 8, 289 (1932) RP414.
- Brownmiller, L. T., Lerch, W.,** Method for approximating the glass content of Portland cement clinker. J 18, 609 (1937) RP997.
- Bruce, C. S., Duck, J. T.,** Utilization of nonpetroleum fuels in automotive engines. J 35, 439 (1945) RP1681.
- Bruce, C. S., Middleton, F. A.,** Engine tests with producer gas. J 36, 171 (1946) RP1698.
- Bruce, H. D.:**
A photometric method for measuring the hiding power of paints. T 20, 173 (1925-26) T306.
Tinting strength of pigments. J 1, 125 (1928) RP7.
- Brumbaugh, I. V.,** Causes of some accidents from gas appliances. An investigation conducted in Baltimore in cooperation with the Baltimore Health Department, United States Public Health Service, and the Consolidated Gas Electric Light & Power Co., T 20, 47 (1925-26) T303.
- Brumbaugh, I. V., Berry, W. M., Eiseman, J. H., Moulton, G. F., Shawn, G. B.,** Relative usefulness of gases of different heating value and adjustments of burners for changes in heating value and specific gravity. T 17, 15 (1922-24) T222.
- Brumbaugh, I. V., Berry, W. M., Moulton, G. F., Shawn, G. B.,** Design of atmospheric gas burners. T 15, (1921) T193.
- Brumbaugh, I. V., Jones, G. W.,** Carbon monoxide in the products of combustion from natural gas burners. T 16, 431 (1921-22) T212.
- Brumbaugh, I. V., McBride, R. S.,** Experimental-retort tests of Orient coal. T 12, (1919) T134.
- Brunetti, C., Hinman, Jr., W. S.,** Raio proximity fuse design. J 37, 1 (1946) RP1723.

- Braun, J. H., Hicks-Braun, M. M.:*
The isolation of the isomers of hexane from petroleum. *J* 5, 933 (1930) RP239.
- Determination of the benzene and the normal hexane content of a midcontinent petroleum.* *J* 6, 869 (1931) RP311.
- Isolation and determination of the cyclohexane in a midcontinent petroleum.* *J* 7, 607 (1931) RP360.
- Isolation and determination of methylcyclopentane in a midcontinent petroleum.* *J* 7, 799 (1931) RP375.
- Isolation and determination of normal heptane and of methylcyclohexane in a midcontinent petroleum. Including a determination of the phase equilibrium diagram for the condensed system normal heptane-methylcyclohexane.* *J* 8, 525 (1932) RP432.
- Isolation of normal decane from petroleum by distillation and equilibrium melting.* *J* 8, 583 (1932) RP438.
- Note on the probable presence of 2,2-dimethylpentane in a mid-continent petroleum.* *J* 9, 53 (1932) RP458.
- Note on the freezing point of "iso-octane" (2, 2, 4-trimethylpentane).* *J* 9, 269 (1932) RP469.
- 1, 1-dimethylcyclopentane and 2-methylhexane in a midcontinent petroleum.* *J* 10, 465 (1933) RP542.
- Braun, J. H., Leslie, R. T., Schicklantz, S. T.,* Determination of the toluene content of a mid-continent petroleum. *J* 6, 363 (1931) RP280.
- Braun, J. H., Schicklantz, S. T.,* Laboratory rectifying stills of glass. *J* 7, 851 (1931) RP379.
- Braun, J. H., Washburn, E. W., Hicks, M. M.,* Apparatus and methods for the separation, identification, and determination of the chemical constituents of petroleum. *J* 2, 467 (1929) RP45.
- Buckingham, E.:*
On the establishment of the thermodynamic scale of temperature by means of the constant-pressure gas thermometer. *B* 3, 237 (1907) S57.
- The theory of the Hampson liquefier.* *B* 6, 125 (1909-10) S123.
- On the definition of the ideal gas.* *B* 6, 409 (1909-10) S136.
- The steam-turbine expansion line on the Mollier diagram and a short method of finding the reheat factor.* *B* 7, 579 (1911) S167.
- The correction for "emergent stem" of the mercurial thermometer.* *B* 8, 239 (1912) S170.
- On the deduction of Wien's displacement law.* *B* 8, 545 (1912) S180.
- Windage resistance of steam-turbine wheels.* *B* 10, 191 (1914) S208.
- Theory and interpretation of experiments on the transmission of sound through partition walls.* *S* 20, 193 (1924-26) S506.
- Notes on small flow meters for air, especially orifice meters.* *T* 14, (1920-21) T183.
- Rate of exhaustion of a closed tank by a reciprocating air pump.* *T* 17, 109 (1922-24) T224.
- Note on contraction coefficients of jets of gas.* *J* 6, 765 (1931) RP303.
- Notes on the orifice meter: The expansion factor for gases.* *J* 9, 61 (1932) RP459.
- Buckingham, E., Bean, H. S., Benesh, M. E.,* Experiments on metering of large volumes of air. *J* 7, 93 (1931) RP335.
- Buckingham, E., Bean, H. S., Murphy, P. S.,* Discharge coefficients of square-edged orifices for measuring the flow of air. *J* 2, 561 (1929) RP49.
- Buckingham, E., Dellinger, J. H.,* On the computation of the constant c_2 of Planck's equation by an extension of Paschen's method of equal ordinates. *B* 7, 393 (1911) S162.
- Buckingham, E., Eckhardt, E. A., Chrisler, V. L., Quayle, P. P., Evans, M. J.,* Transmission of sound through voice tubes. *T* 21, 163 (1926-27) T333.
- Buckingham, E., Edwards, J. D.,* Efflux of gases through small orifices. *S* 15, 573 (1919-20) S359.
- Buckley, F.,* Transformations of the fundamental equations of thermodynamics. *J* 33, 213, (1944) RP1605.
- Buckley, F., Taylor, J. K.,* Application of the Ilkovic equation to quantitative polarography. *J* 34, 97 (1945) RP1631.
- Buckley, J. P., Epstein, S.,* Metallographic polishing. I. Automatic metallographic polishing machine. *J* 3, 783 (1929) RP117.
- Bulkley, R.,* Viscous flow and surface films. *J* 6, 89 (1931) RP264.
- Bulkley, R., Bitner, F. G.:*
A new consistometer and its application to greases and to oils at low temperatures. *J* 5, 83 (1930) RP188.
- Surface tension of soap solutions and its relation to the thickness of adsorbed films.* *J* 5, 951 (1930) RP241.
- Bunting, E. N.:*
Phase equilibria in the system $\text{SiO}_2\text{-ZnO}$. *J* 4, 131 (1930) RP136.
- Phase equilibria in the system $\text{Cr}_2\text{O}_3\text{-SiO}_2$.* *J* 5, 325 (1930) RP203.
- Phase equilibria in the system $\text{Cr}_2\text{O}_3\text{-Al}_2\text{O}_3$.* *J* 6, 947 (1931) RP317.
- Phase equilibria in the system $\text{SiO}_2\text{-ZnO-Al}_2\text{O}_3$.* *J* 8, 279 (1932) RP413.
- Phase equilibria in the systems TiO_2 , $\text{TiO}_2\text{-SiO}_2$, and $\text{TiO}_2\text{-Al}_2\text{O}_3$.* *J* 11, 719 (1933) RP619.
- Bunting, E. N., Euell, R. H., Geller, R. F.,* Thermal decomposition of talc. *J* 15, 551 (1935) RP848.
- Bunting, E. N., Geller, R. F.:*
The system $\text{K}_2\text{O-PbO-SiO}_2$. *J* 17, 277 (1936) RP911.
- The system $\text{PbO-B}_2\text{O}_3$.* *J* 18, 585 (1937) RP995.
- The system $\text{PbO-B}_2\text{O}_3\text{-SiO}_2$.* *J* 23, 275 (1939) RP1231.
- Length changes of whiteware clays and bodies during initial heating, with supplementary data on mica.* *J* 25, 15 (1940) RP1311.
- Report on the systems lead oxide-alumina and lead oxide-alumina-silica.* *J* 31, 255 (1943) RP1564.
- Bunting, E. N., Geller, R. F., Creamer, A. S.:*
The system: PbO-SiO_2 . *J* 13, 237 (1934) RP705.
- Some "soft" glazes of low thermal expansion.* *J* 20, 57 (1938) RP1064.
- Bunting, E. N., McMurdie, H. F.,* X-ray studies of compounds in the system PbO-SiO_2 . *J* 23, 543, (1939) RP1251.
- Bunting, E. N., Shelton, G. R., Creamer, A. S.,* Properties of barium-strontium titanate dielectrics. *J* 33, 337 (1947) RP1776.
- Bunting, E. N., Washburn, E. W.,* Note on phase equilibria in the system $\text{Na}_2\text{O-TiO}_2$. *J* 12, 239 (1934) RP648.
- Burdick, M. D.,* Studies on the system lime-ferrie oxide-silica. *J* 25, 475 (1940) RP1340.
- Burgess, G. K.:*
Radiation from platinum at high temperatures. *B* 1, 443 (1903-05) S24.
- Melting points of the iron-group elements by a new radiation method.* *B* 3, 345 (1907) S62.
- Methods of obtaining cooling curves.* *B* 5, 199 (1908-09) S99.
- The estimation of the temperature of copper by means of optical pyrometers.* *B* 6, 111 (1909-10) S121.
- A micropyrometer.* *B* 9, 475 (1913) S198.
- Temperature measurements in Bessemer and open-hearth practice.* *T* 9, (1916-17) T91.
- Steel rails from sink-head and ordinary rail ingots.* *T* 14, (1920-21) T178.
- Tests of centrifugally cast steel.* *T* 15, (1921) T192.
- The international temperature scale.* *J* 1, 635 (1928) RP22.
- Burgess, G. K., Crowe, J. J.,* Critical ranges A2 and A3 of pure iron. *B* 10, 315 (1914) S213.
- Burgess, G. K., Crowe, J. J., Rawdon, H. S., Waltenberg, R. G.,* Observations on finishing temperatures and properties of rails. *T* 4, (1913-14) T38.
- Burgess, G. K., Foote, P. D.:*
The emissivity of metals and oxides. I. Nickel oxide (NiO) in the range 600 to 1300° C. *B* 11, 41 (1915) S224.
- The emissivity of metals and oxides. IV. Iron and oxide.* *B* 12, 83 (1915-16) S249.
- Characteristics of radiation pyrometers.* *B* 12, 91 (1915-16) S250.
- Burgess, G. K., Kelberg, I. N.,* Electrical resistance and critical ranges of pure iron. *B* 11, 457 (1915) S236.

- Burgess, G. K., Merica, P. D.:*
An investigation of fusible tin boiler plugs. T 5, (1914-15) T53.
Some foreign specifications for railway materials: rails, wheels, axles, tires. T 7, (1916-17) T61.
- Burgess, G. K., Quick, G. W.:*
Thermal stresses in steel car wheels. T 17, 367 (1922-24) T235.
A comparison of the deoxidation effects of titanium and silicon on the properties of rail steel. T 17, 581 (1922-24) T241.
- Burgess, G. K., Sale, P. D.:* A study of the quality of platinum ware. B 12, 289 (1915-16) S254.
- Burgess, G. K., Scott, H.:* Thermoelectric measurement of critical ranges of pure iron. B 14, 15 (1918-19) S296.
- Burgess, G. K., Waidner, C. W.:*
On the temperature of the arc. B 1, 109 (1903-05) S8.
Optical pyrometry. B 1, 189 (1903-05) S11.
Preliminary measurements on temperature and selective radiation of incandescent lamps. B 2, 319 (1906) S40.
Radiation from the melting points of palladium and platinum. B 3, 163 (1907) S55.
Platinum resistance thermometry at high temperatures. B 6, 149 (1909-10) S124.
Note on the temperature scale between 100 and 500° C. B 7, 1 (1911) S143.
On the constancy of the sulphur boiling point. B 7, 127 (1911) S149.
- Burgess, G. K., Wallenberg, R. G.:*
Melting points of the refractory elements. I. Elements of atomic weight from 43 to 59. B 10, 79 (1914) S205.
The emissivity of metals and oxides. II. Measurements with the micropyrometer. B 11, 591 (1915) S242.
Further experiments on the volatilization of platinum. B 13, 365 (1916-17) S280.
- Burgess, G. K., Woodward, R. W.:*
Conservation of tin in bearing metals, bronzes, and solders. T 11, (1918-19) T109.
Manufacture and properties of steel plates containing zirconium and other elements. T 16, 123 (1921-22) T207.
Thermal stresses in chilled iron car wheels. T 16, 193 (1921-22) T209.
- Burgess, H. A., Mueller, E. F.:* Standardization of the sulphur boiling point. S 15, 163 (1919-20) S339.
- Burns, K., Meggers, W. F.:*
Interference measurements of wave lengths in the iron spectrum (2851-3701), with notes on comparisons of lengths of light waves by interference methods, and some wave lengths in the spectrum of neon gas. B 12, 179 (1915-16) S251.
Notes on standard wave lengths, spectrographs, and spectrum tubes. S 18, 185 (1922-23) S441.
- Burns, K., Meggers, W. F., Kiess, C. C.:*
Redetermination of secondary standards of wave length from the new international iron arc. S 19, 263 (1923-24) S478.
Standard solar wave lengths (3952 to 7148 Å). J 1, 297 (1928) RP11.
- Burns, K., Meggers, W. F., Merrill, P. W.:*
Interference measurements of wave lengths in the iron spectrum (3233A-6750A). B 13, 245 (1916-17) S274.
Measurements of wave lengths in the spectrum of neon. B 14, 765 (1918-19) S329.
- Burrows, C. W.:*
The best method of demagnetizing iron in magnetic testing. B 4, 205 (1907-08) S78.
The determination of the magnetic induction in straight bars. B 6, 31 (1909-10) S117.
An experimental study of the Koepsel permeameter. B 11, 101 (1915) S228.
Correlation of the magnetic and mechanical properties of steel. B 13, 173 (1916-17) S272.
- Burrows, C. W., Sanford, R. L.:* An experimental study of the Fahy permeameter. B 14, 267 (1918-19) S306.
- Burton, J. O.:* Permanence studies of current commercial book papers. J 7, 429 (1931) RP349.
- Burton, J. O., Acree, S. F.:* Calculation of the concentration and dissociation constant of each acid group in a mixture from the pH titration curve of the mixture. J 16, 525 (1936) RP889.
- Burton, J. O., Hamer, W. J., Acree, S. F.:*
Dissociation constants of malonic acid in its sodium-salt solutions at 25° C from electrometric titration measurements. J 16, 575 (1936) RP895.
Second ionization constant and related thermodynamic quantities for malonic acid from 0° to 60° C. J 24, 269 (1940) RP1284.
- Burton, J. O., Matheson, H., Acree, S. F.:* A glass electrode potentiometer system for the determination of the pH values of weakly buffered solutions such as natural and treated waters. J 12, 67 (1934) RP634.
- Burton, J. O., Rasch, R. H.:* The determination of the alpha cellulose content and copper number of paper. J 6, 603 (1931) RP295.
- Buzzard, R. W.:*
The utility of the spark test as applied to commercial steels. J 11, 527 (1933) RP605.
Anodizing of aluminum alloys in chromic acid solutions of different concentrations. J 18, 251 (1937) RP975.
- Buzzard, R. W., Wilson, J. H.:*
Deterioration of chromic acid baths used for anodic oxidation of aluminum alloys. J 18, 53 (1937) RP961.
Anodic coating of magnesium alloys. J 18, 83 (1937) RP964.

C

- Cady, F. E., Hyde, E. P.:*
On the determination of the mean horizontal intensity of incandescent lamps by the rotating lamp method. B 2, 415 (1906) S43.
On the determination of the mean horizontal intensity of incandescent lamps. B 3, 375 (1907) S63.
A comparative study of plain and frosted lamps. B 4, 91 (1907-08) S72.
- Cahill, J. C., Flanagan, H. F., Sedlak, V. A., Willingham, C. B., Rossini, F. D., Streiff, A. J., Murphy, E. T.:* Purification, purity, and freezing points of 8 nonanes, 11 alkylcyclopentanes, 6 alkylcyclohexanes, and 4 butylbenzenes of the American Petroleum Institute—Standard and American Petroleum Institute—National Bureau of Standards series. J 38, 53, (1947) RP1760.
- Cain, J. R.:*
The determination of vanadium in vanadium and chrome-vanadium steels. B 7, 377 (1911) S161.
The determination of chromium and its separation from vanadium, in steels. T 1, (1910-12) T6.
Determination of carbon in steel and iron by the barium carbonate titration method. T 4, (1913-14) T33.
Influence of sulphur, oxygen, copper, and manganese on the red-shortness of iron. T 18, 327 (1924-25) T261.
- Cain, J. R., Adler, L.:* Equilibrium conditions in the system carbon, iron oxide, and hydrogen in relation to the Ledebur method for determining oxygen in steel. S 15, 353 (1919-20) S350.
- Cain, J. R., Cleaves, H. E.:* Determination of carbon in steels and irons by direct combustion in oxygen at high temperatures. T 7, (1916-17) T69.
- Cain, J. R., Hostetter, J. C.:* A rapid method for the determination of vanadium in steels, ores, etc., based on its quantitative inclusion by the phosphomolybdate precipitate. T 1, (1910-12) T8.
- Cain, J. R., Maxwell, L. C.:* Electrolytic resistance method for determining carbon in steel. T 12, (1919) T141.
- Cain, J. R., Neville, R. P.:* The preparation and properties of pure iron alloys: I. Effects of carbon and manganese on the mechanical properties of iron. S 18, 411 (1922-23) S453.
- Cain, J. R., Pettijohn, E.:*
Oxygen content by the Ledebur method of acid Bessemer steels deoxidized in various ways. S 15, 259 (1919-20) S346.
A critical study of the Ledebur method for determining oxygen in iron and steel. T 11, (1918-19) T118.
A study of the Goutal method for determining carbon monoxide and carbon dioxide in steels. T 12, (1919) T126.
- Cain, J. R., Schramm, E., Cleaves, H. E.:* Preparation of pure iron and iron-carbon alloys. B 13, 1 (1916-17) S266.

- Cain, J. R., Stokes, H. N.: On the colorimetric determination of iron with special reference to chemical reagents. *B 3*, 115 (1907) S53.
- On sulphocyanic acid. *B 3*, 157 (1907) S54.
- Cain, J. R., Tucker, F. H.: The determination of phosphorus in steels containing vanadium. *T 3*, (1911-16) T24.
- Caldwell, F. R.: Thermoelectric properties of platinum-rhodium alloys. *J 10*, 373 (1933) RP537.
- Caldwell, F. R., Fiock, E. F.: Some factors influencing the performance of diaphragm indicators of explosion pressure. *J 26*, 175 (1941) RP1368.
- Caldwell, F. R., Lewis, A. B., Hall, E. L.: Some electrical properties of foreign and domestic micas and the effect of elevated temperatures on micas. *J 7*, 403 (1931) RP347.
- Caldwell, F. R., Roeser, W. F., Wensel, H. T.: The freezing point of platinum. *J 6*, 1119 (1931) RP326.
- Caldwell, F. R., Swanger, W. H.: Special refractories for use at high temperature. *J 6*, 1131 (1931) RP327.
- Caldwell, F. R., Wensel, H. T., Roeser, W. F., Barbrow, L. E.: The Waldner-Burgess standard of light. *J 6*, 1103 (1931) RP325.
- Deviation of photometric standards for tungsten-filament lamps. *J 13*, 161 (1934) RP699.
- Calingaert, G., White, J. D., Rose, Jr., F. W., Soroos, H.: 2,6-dimethylheptane: Its synthesis, properties and comparison with an isononane from petroleum. *J 22*, 315 (1939) RP1184.
- Came, C. L.: Durability tests of spar varnish. *J 4*, 247 (1930) RP146.
- Canada, W. J., Rosa, E. B., Brooks, H. B., McCollum, E., Glading, F. W.: Investigation of cartridge-inclosed fuses. *T 8*, (1916-17) T74.
- Cannon, Jr., J. Q.: Standards and specifications for nonmetallic minerals and their products. M110 (1930).
- Carhart, H. S.: Thermodynamics of concentration cells. *B 7*, 475 (1911) S165.
- Carlson, E. T.: The decomposition of tricalcium silicate in the temperature range, 1000°-1300° C. *J 7*, 893 (1931) RP381.
- The system: $\text{CaO}-\text{B}_2\text{O}_3$. *J 9*, 825 (1932) RP510.
- Carr, A. S., Sager, E. E., Schooley, M. R., Acree, S. F.: Ultraviolet spectra and dissociation constants of *p*-hydroxy benzoic acid, methyl, ethyl, *n*-butyl, and benzyl *p*-hydroxybenzoate, and potassium *p*-phenolsulfonate. *J 35*, 521 (1945) RP1636.
- Carr, R. W., Scribner, B. W.: Standards for paper towels. C407 (1935).
- Carroll, B. H., Hubbard, D.: Sensitization of photographic emulsions by colloidal materials. *J 1*, 565 (1928) RP20.
- Spectral sensitization of photographic emulsions. Notes on bathing with pinacyanol-pinaflavol mixtures. *J 4*, 693 (1930) RP173.
- A comparison of resolving power and sensitivity of photographic plates with varying development. *J 5*, 1 (1930) RP183.
- The photographic emulsion: After-ripening. *J 7*, 219 (1931) RP340.
- The photographic emulsion: The silver ion-gelatin equilibrium. *J 7*, 811 (1931) RP376.
- The photographic emulsion: Silver ion and hydrogen ion concentrations and sensitivity. *J 8*, 481 (1932) RP430.
- The photographic emulsion: Analysis for non-halide silver and soluble bromide. *J 8*, 711 (1932) RP447.
- The photographic emulsion: Variables in sensitization by dyes. *J 9*, 529, (1932) RP488.
- The photographic emulsion: The mechanism of hypersensitization. *J 10*, 211 (1933) RP525.
- The photographic emulsion: Sensitization by sodium sulphite. *J 11*, 743 (1933) RP622.
- Kinetics of reaction between silver bromide and photographic sensitizers. *J 12*, 329 (1934) RP659.
- Carroll, B. H., Hubbard, D., Kretschman, C. M.: The photographic emulsion: Notes on stability of finished plates. *J 12*, 223 (1934) RP646.
- Carroll, B. H., Kretschman, C. M.: Photographic reversal by desensitizing dyes. *J 10*, 449 (1933) RP541.
- Carroll, L. B., Zobel, C. G. F.: A hot-wire anemometer for measuring air flow through engine radiators. *T 19*, 287 (1924-25) T287.
- Carson, C. M., Blum, W., Liscomb, F. J.: Zinc cyanide plating solutions. *T 15*, (1921) T195.
- Carson, F. T.: Measurement of the degree of sizing of paper. *T 20*, 703 (1925-26) T326.
- Critical study of methods of measuring the bulk of paper. *J 2*, 1039 (1929) RP69.
- A sensitive instrument for measuring the air permeability of paper and other sheet materials. *J 12*, 567 (1934) RP681.
- Effect of experimental conditions on the measurement of air permeability of paper. *J 12*, 587 (1934) RP682.
- A microburette for testing the absorptiveness of thin paper. *J 18*, 41 (1937) RP959.
- Some observations on determining the size of pores in paper. *J 24*, 435 (1940) RP1292.
- Effect of humidity on physical properties of paper. C445 (1944).
- Permeability of membranes to water vapor with special reference to packaging materials. M127 (1937).
- Carson, F. T., Bogaty, H.: Measurement of rate of flow of water through filter paper. *J 33*, 353 (1944) RP1613.
- Carson, F. T., Scribner, B. W.: A study of casing papers for the purpose of developing standard specifications. *T 20*, 355 (1925-26) T312.
- Carson, F. T., Scribner, B. W., Weber, C. G.: Development of standards for flexible casing materials. M182 (1946).
- Carson, F. T., Shaw, M. B.: Wearing quality of experimental currency-type paper. *J 36*, 249 (1946) RP1701.
- Carson, F. T., Snyder, L. W.: Calibration and adjustment of the Schopper folding tester. *T 22*, 125 (1927-28) T357.
- Carson, F. T., Weber, C. G., Snyder, L. W.: Properties of fiber building boards. M132 (1931).
- Carson, F. T., Worthington, F. V.: A study of sheathing papers. *J 3*, 75 (1929) RP85.
- Critical study of the bursting strength test for paper. *J 6*, 339 (1931) RP278.
- Carson, F. T., Worthington, F. V.: Evaluating the wearing quality of currency paper. *J 26*, 467 (1941) RP1390.
- Measuring the degree of curl of paper. *J 30*, 113 (1943) RP1522.
- Apparatus for determining water-vapor permeability of moisture barriers. C453 (1946).
- Carter, F. R., Brooks, D. B., Cleaton, R. B.: Paraffin hydrocarbons isolated from crude synthetic isooctane (2, 4, 4-trimethylpentane). *J 19*, 319 (1937) RP1027.
- Case, F. A., Gardner, I. C.: An optical coincidence gage. *J 6*, 229 (1931) RP272.
- The lateral chromatic aberration of apochromatic microscope systems. *J 6*, 937 (1931) RP316.
- Precision camera for testing lenses. *J 18*, 449 (1937) RP984.
- The making of mirrors by the deposition of metal on glass. C389 (1931).
- Case, N. P.: A precise and rapid method of measuring frequencies from 5 to 200 cycles per second. *J 9*, 237 (1930) RP195.
- Castleman, Jr., R. A.: The mechanism of the atomization of liquids. *J 6*, 369 (1931) RP281.
- Caul, H. J., Hoffman, J. I., Leslie, R. T., Clark, L. J., Hoffman, J. D.: Development of a hydrochloric acid process for the protection of alumina from clay. *J 37*, 409 (1946) RP1756.
- Caul, H. J., Schoonover, I. C.: Analysis of dental amalgams containing mercury, silver, gold, tin, copper, and zinc. *J 26*, 481 (1941) RP1394.
- Central Housing Committee on Research, Design and Construction: Field Inspectors' checks list for building construction. BMS81 (1942).
- A method for developing specifications for building construction. BMS87 (1942).
- Recommended building code requirements for new dwelling construction with special reference to war housing. BMS88 (1942).
- A glossary of housing terms. BMS91 (1942).
- Fire-resistance classifications of building constructions. BMS92 (1942).

- Charles, A. M., Kanagy, J. R., Abrams, E., Tener, R. F., Effects of mildew on vegetable-tanned strap leather. *J* 36, 441 (1946) RP1713.
- Charlton, A. L., Singer, G., Taylor, L. S., Concrete as a protective material against high-voltage X-rays. *J* 21, 783 (1938) RP1155.
- Charlton, A. L., Taylor, L. S., Singer, G., Measurement of supervoltage X-rays with the free-air ionization chamber. *J* 21, 19 (1938) RP1111.
- Chase, W. D., Jackson, R. F., Mathews, J. A., Analytical methods for the determination of levulose in crude products. *J* 9, 597 (1932) RP495.
- Chenault, R. L., Ruark, A. E., Mohler, F. L., Foote, P. D., Spectra and critical potentials of fifth group elements. *S* 19, 463 (1923-24) S490.
- Cheney, R. K., Scott, R. B., Wacker, P. F., Heat capacities of gaseous oxygen, isobutane, and 1-butene from -30° to $+90^{\circ}$ C. *J* 38, 651 (1947) RP1804.
- Cheney, W. L.:
Magnetic testing of straight rods in intense fields. *S* 15, 625 (1919-20) S361.
Measurement of hysteresis values from high magnetizing forces. *S* 16, 281 (1920) S383.
Preparation and properties of pure iron alloys: II. Magnetic properties of iron-carbon alloys as affected by heat treatment and carbon content. *S* 18, 609 (1922-23) S463.
- Cheney, W. L., Nusbaum, C., Effect of the rate of cooling on the magnetic and other properties of an annealed eutectoid carbon steel. *S* 17, 65 (1922) S408.
- Cheney, W. L., Nusbaum, C., Scott, H., The magnetic reactivity relationship as related to certain structures of a eutectoid-carbon steel. *S* 16, 739 (1920) S404.
- Cheney, W. L., Sanford, R. L., Variation of residual induction and coercive force with magnetizing force. *S* 16, 291 (1920) S384.
- Cheney, W. L., Sanford, R. L., Barry, J. M., Effect of wear on the magnetic properties and tensile strength of steel wire. *S* 20, 339 (1924-26) S510.
- Chrisler, V. L.:
Sound insulation of wall and floor constructions. Supplement to BMS17 (1940).
Transmission of sound through building materials. *S* 22, 227 (1927-28) S552.
Soundproofing of apartment houses. *T* 21, 255 (1926-27) T337.
Dependence of sound absorption upon the area and distribution of the absorbent material. *J* 13, 169 (1934) RP700.
Effect of paint on the sound absorption of acoustic materials. *J* 24, 547 (1940) RP1298.
A discussion of some of the principles of acoustical insulation. C403 (1933).
Sound insulation of wall and floor constructions. BMS17 (1939).
- Chrisler, V. L., Eckhardt, E. A., Transmission and absorption of sound by some building materials. *S* 21, 37 (1926-27) S526.
- Chrisler, V. L., Eckhardt, E. A., Quayle, P. P., Evans, M. J., Buckingham, E., Transmission of sound through voice tubes. *T* 21, 163 (1926-27) T333.
- Chrisler, V. L., Heyl, P. R., Architectural acoustics. C418 (1938).
- Chrisler, V. L., Heyl, P. R., Snyder, W. F., The absorption of sound at oblique angles of incidence. *J* 4, 289 (1930) RP149.
- Chrisler, V. L., Miller, C. E., Some of the factors which affect the measurement of sound absorption. *J* 9, 175 (1932) RP465.
- Chrisler, V. L., Snyder, W. F.:
Transmission of sound through wall and floor structures. *J* 2, 541 (1929) RP48.
Soundproofing of airplane cabins. *J* 2, 897 (1929) RP63.
The measurement of sound absorption. *J* 5, 957 (1930) RP242.
Recent sound-transmission measurements at the National Bureau of Standards. *J* 14, 749 (1935) RP800.
- Chrzanowski, P., Cook, R. K., Absorption and scattering by sound-absorbent cylinders. *J* 36, 393 (1946) RP1709.
- Chrzanowski, P., Heyl, P. R., A new determination of the constant of gravitation. *J* 29, 1 (1942) RP1480.
- Churchill, J. B., Bowker, R. C., Effects of oils, greases, and degree of tannage on the physical properties of russet harness leather. *T* 13, (1919-20) T160.
- Churchill, J. B., Wormeley, P. L., Bowker, R. C., Hari, R. W., Whitmore, L. M., Effects of glucose and salts on the wearing quality of sole leather. *T* 12, (1919) T138.
- Clabaugh, W. S., A method for determining small amounts of gold, and its use in ascertaining the thickness of electrodeposited gold coating. *J* 36, 119 (1946) RP1694.
- Clabaugh, W. S., Wichers, E., Finn, A. N., Comparative tests of chemical glassware. *J* 26, 537 (1941) RP1394.
- Clark, A. P., Comparative bond efficiency of deformed concrete bars. *J* 37, 399 (1946) RP1755.
- Clark, E. P.:
Preparation of galactose. *S* 17, 227 (1922) S416.
Note on the preparation of mannose. *S* 17, 567 (1922) S429.
An improved method for preparing raffinose. *S* 17, 607 (1922) S432.
The structure of fucose. *S* 18, 527 (1922-23) S459.
- Clark, G. L., Gross, S. T., Smith, W. H.:
X-ray diffraction patterns of crystalline sol rubber prepared from ethereal solution. *J* 22, 105 (1939) RP1170.
X-ray diffraction patterns of Hevea, Manihot, and other rubbers. *J* 23, 1 (1939) RP1218.
- Clark, G. L., Wolhuis, E., Smith, W. H., X-ray diffraction patterns of sol, gel, and total rubber when stretched and when crystallized by freezing and from solutions. *J* 19, 479 (1937) RP1039.
- Clark, L. J., Hoffman, J. I., Leslie, R. T., Caul, H. J., Hoffman, J. D., Development of a hydrochloric acid process for the production of alumina from clay. *J* 37, 409 (1946) RP1756.
- Clarke, W. F., Flint, E. P., Newman, E. S., Shartsis, L., Bishop, D. L., Wells, L. S., Extraction of alumina from clays and high-silica bauxites. *J* 36, 63 (1946) RP1691.
- Clarke, W. F., Wells, L. S., McMurdie, H. F., Study of the system $\text{CaO-Al}_2\text{O}_3\text{-H}_2\text{O}$ at temperatures of 21° and 90° C. *J* 30, 367 (1943) RP1539.
- Cleaton, R. B., Brooks, D. B., Carter, F. R., Paraffin hydrocarbons isolated from crude synthetic isooctane (2, 2, 4-trimethylpentane). *J* 19, 319 (1937) RP1027.
- Cleary, C. J., Lewis, W. S., Standardization of automobile-tire fabric testing. *T* 7, (1916-17) T68.
- Cleaves, H. E., Cain, J. R., Determination of carbon in steels and irons by direct combustion in oxygen at high temperatures. *T* 7, (1916-17) T69.
- Cleaves, H. E., Cain, J. R., Schramm, E., Preparation of pure iron and iron-carbon alloys. *Bul.* BS 13, 1 (1916-17) S266.
- Cleaves, H. E., Hiegel, J. M., Properties of high-purity iron. *J* 28, 643 (1942) RP1472.
- Cleaves, H. E., Thompson, J. G.:
A summary of information on the preparation and properties of pure iron. *J* 16, 105 (1936) RP860.
Preparation of iron oxide as a source of high-purity iron. *J* 18, 595 (1937) RP996.
Preparation of high-purity iron. *J* 23, 163 (1939) RP1226.
- Cleveland, R. S., An improved apparatus for measuring the thermal transmission of textiles. *J* 19, 675 (1937) RP1055.
- Cleveland, R. S., Hamm, H. A., Relation between the twist and certain properties of rayon yarns. *J* 7, 617 (1931) RP361.
- Cleveland, R. S., Schiefer, H. F.:
Wear of carpets. *J* 12, 155 (1934) RP640.
Factors affecting the performance of hosiery on the hosiery testing machine. *J* 14, 1 (1935) RP753.
A critical study of some factors affecting the breaking strength and elongation of cotton yarns. *J* 27, 325 (1941) RP1422.
A basis for a performance specification for women's full-fashioned silk hosiery. M149 (1935).
- Cleveland, R. S., Schiefer, H., Porter, J. W., Miller, J., Effect of weave on the properties of cloth. *J* 11, 441 (1933) RP600.
- Clyne, R. W., McAdam, Jr., D. J., Influence of chemically and mechanically formed notches on fatigue of metals. *J* 13, 527 (1934) RP725.

- Cobb, R. M., Weber, C. G., Register studies in offset lithography. J 9, 427 (1932) RP480.
- Coblentz, W. W.: Radiometric investigations of infra-red absorption and reflection spectra. B 2, 457 (1906) S45.
- A vacuum radiomicrometer. B 2, 479 (1906) S46.
- Instruments and methods used in radiometry. B 4, 391 (1907-08) S85.
- Selective radiation from the Nernst glower. B 4, 533 (1907-08) S91.
- Selective radiation from various solids. I. B 5, 159 (1908-09) S97.
- Radiation constants of metals. B 5, 339 (1908-09) S105.
- The thermoelectric properties of tantalum and tungsten. B 6, 107 (1909-10) S120.
- Selective radiation from various solids II. B 6, 301 (1909-10) S131.
- The reflecting power of various metals. B 7, 197 (1911) S152.
- Selective radiation from various substances. III. B 7, 243 (1911) S156.
- Radiometric investigation of water of crystallization, light filters, and standard absorption bands. B 7, 619 (1911) S168.
- Instruments and methods used in radiometry. II. B 9, 7 (1913) S188.
- Selective radiation from various substances. IV. B 9, 81 (1913) S191.
- The diffuse reflecting power of various substances. B 9, 283 (1913) S196.
- The constants of spectral radiation of a uniformly heated enclosure or so-called black body, Part I. B 10, 1 (1914) S204.
- Measurements on standards of radiation in absolute value. B 11, 87 (1915) S227.
- Various modifications of bismuth-silver thermopiles having a continuous absorbing surface. B 11, 131 (1915) S229.
- Absorption, reflection, and dispersion constants of quartz. B 11, 471 (1915) S237.
- A comparison of stellar radiometers and radiometric measurements on 110 stars. B 11, 613 (1915) S244.
- Present status of the determination of the constant of total radiation from a black body. B 12, 553 (1915-16) S262.
- Sensitivity and magnetic shielding tests of a Thomson galvanometer for use in radiometry. B 13, 423 (1916-17) S282.
- Constants of spectral radiation of a uniformly heated inclosure or so-called black body, II. B 13, 459 (1916-17) S284.
- Emissivity of straight and helical filaments of tungsten. B 14, 115 (1918-19) S300.
- Instruments and methods used in radiometry III: The photoelectric cell and other selective radiometers. B 14, 507 (1918-19) S319.
- Photoelectrical sensitivity of bismuthinite and various other substances. B 14, 591 (1918-19) S322.
- Constants of radiation of a uniformly heated inclosure. S 15, 529 (1919-20) S357.
- Methods for computing and intercomparing radiation data. S 15, 617 (1919-20) S360.
- Distribution of energy in the spectrum of an acetylene flame. S 15, 639 (1919-20) S362.
- Reflecting power of monel metal, stellite, and zinc. S 16, 249 (1920) S379.
- The spectrophotoelectric sensitivity of thalofide. S 16, 253 (1920) S380.
- Positive and negative photoelectrical properties of molybdenite and several other substances. S 16, 595 (1920) S398.
- Infra-red transmission and refraction data on standard lens and prism material. S 16, 701 (1920) S401.
- Present status of the constants and verification of the laws of thermal radiation of a uniformly heated inclosure. S 17, 7 (1922) S406.
- Spectrophotoelectrical sensitivity of proustite. S 17, 179 (1922) S412.
- A portable vacuum thermopile. S 17, 187 (1922) S413.
- Spectroradiometric investigation of the transmission of various substances, II. S 17, 267 (1922) S418.
- Tests of stellar radiometers and measurements of the energy distribution in the spectra of 16 stars. S 17, 725 (1922) S438.
- Spectrophoto-electrical sensitivity of argentite. S 18, 265 (1922-23) S446.
- Further tests of stellar radiometers and some measurements of planetary radiation. S 18, 535 (1922-23) S460.
- Various photo-electrical investigations. S 18, 585 (1922-23) S462.
- Some new thermoelectrical and actinoelectrical properties of molybdenite. S 19, 375 (1923-24) S486.
- Temperature estimates of the planet Mars. S 20, 371 (1924-26) S512.
- Temperature estimates of the planet Mars, 1924 and 1926. J 28, 297 (1942) RP1458.
- Coblentz, W. W., Dorcas, M. J., Hughes, C. W., Radiometric measurements on the carbon arc and other light sources used in phototherapy. S 21, 535 (1926-27) S539.
- Coblentz, W. W., Eckford, J. F.: Spectrophoto-electrical sensitivity of bournonite and pyrrargyrite. S 18, 353 (1922-23) S451.
- Spectrophoto-electrical sensitivity of some halide salts of thallium, lead, and silver. S 18, 489 (1922-23) S456.
- Coblentz, W. W., Emerson, W. B.: Studies of instruments for measuring radiant energy in absolute value: An absolute thermopile. B 12, 503 (1915-16) S261.
- Distribution of energy in the visible spectrum of an acetylene flame. B 13, 355 (1916-17) S279.
- Relative sensibility of average eye to light of different colors and some practical applications to radiation problems. B 14, 167 (1918-19) S303.
- Luminous radiation from a black body and mechanical equivalent of light. B 14, 255 (1918-19) S305.
- The reflecting power of tungsten and stellite. B 14, 307 (1918-19) S308.
- Glasses for protecting eyes from injurious radiations. T 9, (1916-17) T93.
- Coblentz, W. W., Emerson, W. B., Long, M. B., Spectroradiometric investigation of the transmission of various substances. B 14, 653 (1918-19) S325.
- Coblentz, W. W., Fulton, H. R., A radiometric investigation of the germicidal action of ultra-violet radiation. S 19, 641 (1923-24) S495.
- Coblentz, W. W., Graceley, F. R., Stair, R., Measurements of ultraviolet solar- and sky-radiation intensities in high latitudes. J 28, 581 (1942) RP1469.
- Coblentz, W. W., Hughes, C. W.: Ultra-violet reflecting power of some metals and sulphides. S 19, 577 (1923-24) S493.
- Spectral energy distribution of the light emitted by plants and animals. S 21, 521 (1926-27) S538.
- Emissive tests of paints for decreasing or increasing heat radiation from surfaces. T 18, 171 (1924-25) T254.
- Coblentz, W. W., Ives, H. E., Luminous efficiency of the firefly. B 6, 321 (1909-10) S132.
- Coblentz, W. W., Kahler, H.: Some optical and photoelectric properties of molybdenite. S 15, 121 (1919-20) S338.
- Reflecting power of stellite and lacquered silver. S 16, 215 (1919-20) S342.
- Spectral photoelectric sensitivity of silver sulphide and several other substances. S 15, 231 (1919-20) S344.
- A new spectropyrheliometer and measurements of the component radiations from the sun and from a quartz mercury vapor lamp. S 16, 233 (1920) S378.
- Coblentz, W. W., Lampland, C. O., Further radiation measurements and temperature estimates of the planet Mars, 1926. S 22, 237 (1927-28) S553.
- Coblentz, W. W., Long, M. B., Kahler, H., The decrease in ultra-violet and total radiation with usage of quartz mercury vapor lamps. S 15, 1 (1919-20) S330.
- Coblentz, W. W., Stair, R.: Transmissive properties of eye-protective glasses and other substances. T 22, 555 (1927-28) T369.
- Reflecting power of beryllium, chromium, and several other metals. J 2, 343 (1929) RP39.

- Data on ultra-violet solar radiation and the solarization of window materials. J 3, 629 (1929) RP113.
- Ultra-violet reflecting power of aluminum and several other metals. J 4, 189 (1930) RP141.
- Measurement of extreme ultra-violet solar radiation by a filter method. J 6, 951 (1931) RP318.
- The present status of the standards of the thermal radiation maintained by the Bureau of Standards. J 11, 79 (1933) RP578.
- Infrared absorption spectra of some plant pigments. J 11, 703 (1933) RP617.
- Data on the spectral erythemic reaction of the untanned human skin to ultraviolet radiation. J 12, 13 (1934) RP631.
- A portable ultraviolet intensity meter, consisting of a balanced amplified, photoelectric cell, and microammeter. J 12, 231 (1934) RP647.
- Ultraviolet transmission changes in glass as a function of the wave length of the radiation stimulus. J 13, 773 (1934) RP744.
- Factors affecting ultraviolet solar-radiation intensities. J 15, 123 (1935) RP816.
- Infrared absorption spectra of plant and animal tissue and of various other substances. J 15, 295 (1935) RP830.
- A standard source of ultraviolet radiation for calibrating photoelectric dosage intensity meters. J 16, 83 (1936) RP858.
- Evaluation of ultraviolet solar radiation of short wave lengths. J 16, 315 (1936) RP877.
- Distribution of the energy in the extreme ultraviolet of the solar spectrum. J 17, 1 (1936) RP899.
- Radiometric measurements of ultraviolet solar intensities in the stratosphere. J 20, 185 (1938) RP1075.
- Note on the spectral reflectivity of rhodium. J 22, 93 (1939) RP1168.
- Distribution of ozone in the stratosphere. J 22, 573 (1939) RP1207.
- Distribution of ozone in the stratosphere: Measurements of 1939 and 1940. J 26, 161 (1941) RP1367.
- Measurements of ultraviolet solar radiation in Washington, 1936 to 1942. J 30, 434 (1943) RP1542.
- A daily record of ultraviolet solar and sky radiation in Washington, 1941 to 1943. J 33, 21 (1944) RP1593.
- Spectral-transmissive properties and use of colored eye-protective glasses. C421 (1938).
- Coblentz, W. W., Stair, R., Hogue, J. M.:
A balanced thermocouple and filter method of ultra-violet radiometry with practical applications. J 7, 723 (1931) RP370.
- The spectral erythemic reaction of the untanned human skin to ultra-violet radiation. J 8, 541 (1932) RP433.
- Tests of a balanced thermocouple and filter radiometer as a standard ultra-violet dosage intensity meter. J 8, 759 (1932) RP450.
- Measurements of ultra-violet solar radiation in various localities. J 10, 79 (1933) RP517.
- Coblentz, W. W., Stair, R., Schoffstall, C. W., Some measurements of the transmission of ultra-violet radiation through various kinds of fabrics. J 1, 105 (1928) RP6.
- Coblentz, W. W., Wallenberg, R. G., Preparation and reflective properties of some alloys of aluminum with magnesium and with zinc. S 15, 653 (1919-20) S363.
- Coffin, J. G.:
Construction and calculation of absolute standards of inductance. B 2, 87 (1906) S29.
- Influence of frequency upon the self-inductance of coils. B 2, 275 (1906) S37.
- Cohen, L.:
An exact formula for the mutual inductance of coaxial solenoids. B 3, 295 (1907) S58.
- The influence of frequency on the resistance and inductance of solenoidal coils. B 4, 161 (1907-08) S76.
- The self-inductance of a solenoid of any number of layers. B 4, 383 (1907-08) S84.
- Note on the approximate value of Bessel's functions for large arguments. B 5, 227 (1908-09) S100.
- The influence of terminal apparatus on telephonic transmission. B 5, 231 (1908-09) S101.
- The theory of coupled circuits. B 5, 511 (1908-09) S112.
- The coefficient of reflection of electrical waves at a transition point. B 5, 549 (1908-09) S114.
- Coupled circuits in which the secondary has distributed inductance and capacity. B 6, 247 (1909-10) S126.
- Cohen, L., Rosa, E. B.:
The mutual inductance of two circular coaxial coils of rectangular section. B 2, 359 (1906) S42.
- The mutual inductance of coaxial solenoids. B 3, 305 (1907) S59.
- On the self-inductance of circles. B 4, 149 (1907-08) S75.
- Formulae and tables for the calculation of mutual and self-inductance. B 5, 1 (1908-09) S93.
- Coleman, E. F., Heald, R. H., Air infiltration through windows. BMS45 (1940).
- Coleman, R. L., Physical properties of dental materials (gold alloys and accessory materials). J 1, 867 (1928) RP32.
- Conrad, C. M., Whistler, R. L., Martin, A. R., Pectic substance of cotton fibers in relation to growth. J 25, 305 (1940) RP1326.
- Cook, C. M., Holt, W. L., Measurement of the tread movement of pneumatic tires and a discussion of the probable relation to tread wear. J 1, 19 (1928) RP2.
- Cook, G. S., Heyl, P. R., The value of gravity at Washington. J 17, 805 (1936) RP946.
- Cook, J. W., The production of liquid air on a laboratory scale. S 17, 277 (1922) S419.
- Cook, J. W., Scott, R. B., Brickwedde, F. G., Silvering and evacuating pyrex Dewar flasks. J 7, 935 (1931) RP385.
- Cook, R. K., Absolute pressure calibrations of microphones. J 25, 489 (1940) RP1341.
- Cook, R. K., Chrzanowski, P., Absorption and scattering by sound-absorbent cylinders. J 36, 393 (1946) RP1709.
- Cooke, G. J., Heindl, R. A., Fire-clay ladle sleeves. J 20, 411 (1938) RP1084.
- Cooley, P. A., Supplement to national directory of commodity specifications. Supplement to M178 (1947).
- Cooley, P. A., Rapuzzi, A. E., National directory of commodity specifications. M178 (1945).
- Cooter, I. L., Peters, C. G., Emerson, W. B., Nefflen, E., Harris, F. K., Electrical methods for diamond-die production. J 38, 449 (1947) RP1787.
- Cooter, I. L., Wenner, F., Peterson, C., A vacuum-tube alternating-voltage compensator. J 25, 41 (1940) RP1312.
- Cordero, F., Brombacher, W. G., Goerke, V. H., Sensitive aneroïd diaphragm capsule with no deflection above a selected pressure. J 24, 31 (1940) RP1270.
- Cork, J. M., Airplane antenna constants. S 15, 199 (1919-20) S341.
- Corliss, C. H., Scribner, B. F.:
An improved electrode holder for spectrographic analysis. J 30, 41 (1943) RP1515.
- Spectrographic determination of boron in steel. J 36, 351 (1946) RP1705.
- Corruccini, R. J., Ginnings, D. C.:
An improved ice calorimeter — the determination of its calibration factor and the density of ice at 0° C. J 38, 583 (1947) RP1796.
- Enthalpy, specific heat, and entropy of aluminum oxide from 0° to 900° C. J 38, 593 (1947) RP1797.
- Cosette, L. G., Heindl, R. A., Massengale, G. B., Slip casting of clay pots for the manufacture of optical glass at the National Bureau of Standards. C452 (1946).
- Cotter, J. B., Whittemore, H. L., Stang, A. H., Phelan, V. B.,
Strength of houses: application of engineering principles to structural design. BMS109 (1947).
- Cottony, H. V., Dill, R. S.:
Solar heating of various surfaces. BMS64 (1941).
- Laboratory observations of condensation in wall specimens. BMS106 (1946).
- Crafton, Jr., H. C., Brooks, D. B., Howard, F. L.:
Physical properties of purified 2,2,3-trimethylpentane. J 23, 637 (1939) RP1259.
- Physical properties of some purified aliphatic hydrocarbons. J 24, 33 (1940) RP1271.

- Cragoe, C. S.: Slopes of pv isotherms of He, Ne, A, H₂, N₂, and O₂ at 0° C. J 26, 495 (1941) RP1393.
Thermal properties of petroleum products. M97 (1929).
- Cragoe, C. S., Harper, D. R., Specific volume of liquid ammonia. S 17, 287 (1922) S420.
- Cragoe, C. S., Hill, E. E., Thermal expansions of gasolines from 0° to 30° C. J 7, 1133 (1931) RP393.
- Cragoe, C. S., McKelvey, E. C., O'Connor, G. F., Specific volume of saturated ammonia vapor. S 18, 707 (1922-23) S467.
- Cragoe, C. S., Meyers, C. H., Taylor, C. S., Vapor pressure of ammonia. S 16, 1 (1920) S369.
- Cragoe, C. S., Osborne, N. S., Stimson, H. F., Sligh, Jr., T. S., Specific heat of superheated ammonia vapor. S 20, 65 (1924-26) S501.
- Cragoe, C. H., Peters, C. G., Measurements of thermal dilation of glass at high temperatures. S 16, 449 (1920) S393.
- Craig, D. N.: Determination of small quantities of volatile organic acids in sulphuric acid solutions. J 6, 169 (1931) RP267.
Electrolytic resistors for direct-current applications in measuring temperatures. J 21, 225 (1938) RP1126.
- Craig, D. N., Vinal, G. W.: The viscosity of sulphuric-acid solutions used for battery electrolytes. J 10, 781 (1933) RP566.
Resistivity of sulphuric-acid solutions and its relation to viscosity and temperature. J 13, 689 (1934) RP738.
Chemical reactions in the lead storage battery. J 14, 449 (1935) RP778.
Solubility of lead sulfate in solutions of sulfuric acid, determined by dithionite with a photonic cell. J 22, 55 (1939) RP1165.
Thermodynamic properties of sulfuric-acid solutions and their relation to the electromotive force and heat of reaction of the lead storage battery. J 24, 475 (1940) RP1294.
- Craig, D. N., Vinal, G. W., Snyder, C. L.: Composition of grids for positive plates of storage batteries as a factor influencing the sulphation of negative plates. J 10, 795 (1933) RP567.
Note on the effects of cobalt and nickel in storage batteries. J 25, 417 (1940) RP1335.
- Craig, D. N., Vinal, G. W., Vinal, F. E., Solubility of mercurous sulphate in sulphuric-acid solutions. J 17, 709 (1936) RP939.
- Creamer, A. S., Bunting, E. N., Shelton, G. R., Properties of barium-strontium titanate dielectrics. J 38, 337 (1947) RP1776.
- Creamer, A. S., Geller, R. F.: "Moisture expansion" of ceramic whiteware. J 9, 291 (1932) RP472.
Solubility of colored glazes in organic acids. J 22, 441 (1939) RP 1196.
Some factors affecting the properties of ceramic talcose white-ware. J 26, 213 (1941) RP1371.
- Creamer, A. S., Geller, R. F., Bunting, E. N.: The system: PbO-SiO₂. J 13, 237 (1934) RP705.
Some "soft" glazes of low thermal expansion. J 20, 57 (1938) RP1064.
- Creamer, A. S., Geller, R. F., Evans, D. N., Effects of particle size of a potter's "flint" and a feldspar in whiteware. J 11, 327 (1933) RP594.
- Creamer, A. S., Geller, R. F., Yavorsky, P. J., Steierman, B. L., Studies of binary and ternary combinations of magnesia, calcia, baria, beryllia, alumina, thoria, and zirconia in relation to their use as porcelains. J 36, 277 (1946) RP1703.
- Crehore, A. C., Squier, G. O., Note on oscillatory interference bands and some of their practical applications. B 7, 131 (1911) S150.
- Creitz, E. C., Smith, F. A., Eisman, J. H., Tests of instruments for the determination, indication, or recording of the specific gravities of gases. M177 (1947).
- Critchfield, C. L., Beek, Jr., J., A method for finding the roots of the equation $f(x)=0$ where f is analytic. J 14, 595 (1935) RP790.
- Critchfield, C. L., Curtis, H. L., Curtis, R. W., An absolute determination of the ampere, using improved coils. J 22, 485 (1939) RP1200.
- Critchfield, C. L., Curtis, R. W., Driscoll, R. L., An absolute determination of the ampere, using helical and spiral coils. J 23, 133 (1942) RP1449.
- Critchfield, C. L., Evans, W. D., The effect of atmospheric moisture on the physical properties of vegetable and chrome tanned calf leathers. J 11, 147 (1933) RP583.
- Critchfield, C. L., Wallace, E. L., Beek, Jr., J.: Effect of sulphuric acid on chrome-tanned leather. J 14, 771 (1935) RP802.
Influence of sulphated cod-liver oil on the deterioration of vegetable-tanned leathers by sulphuric acid. J 15, 73 (1935) RP811.
- Critchfield, C. L., Wallace, E. L., Kanagy, J. R., Influence of some sulphur-containing tanning materials on the deterioration of vegetable-tanned leathers by sulphuric acid. J 16, 369 (1935) RP835.
- Crittenden, E. C., McBride, R. S., Dunkley, W. A., Taylor, A. H., The influence of quality of gas and other factors upon the efficiency of gas-mantle lamps. T 11, (1918-19) T110.
- Crittenden, E. C., Richtmyer, F. K., An "average eye" for heterochromatic photometry, and comparison of a flicker and an equality-of-brightness photometer. B 14, 87 (1918-19) S299.
- Crittenden, E. C., Rosa, E. B., Flame standards in photometry. B 10, 557 (1914) S222.
- Crittenden, E. C., Taylor, A. H., The pentane lamp as a working standard. B 10, 391 (1914) S216.
- Cross, H. C., Epstein, S., Groesbeck, E. C., Wymore, I. J., Observations on the iron-nitrogen system. J 3, 1005 (1929) RP126.
- Cross, H. C., French, H. J., Peterson, A. A., Creep in five steels at different temperatures. T 22, 235 (1927-28) T362.
- Cross, H. C., French, H. J., Rosenberg, S. J., Harbaugh, W. LeC., Wear and mechanical properties of railroad bearing bronzes at different temperatures. J 1, 343 (1928) RP13.
- Cross, H. C., Hill, E. E., Density of hot-rolled and heat-treated carbon steels. S 22, 451 (1927-28) S562.
- Crowder, J. A., Harris, M., Mechanism of the sulfur lability in the alkali degradation of wool protein. J 16, 475 (1936) RP885.
- Crowe, J. J., Burgess, G. K., Critical ranges A2 and A3 of pure iron. B 10, 315 (1914) S213.
- Crowe, J. J., Burgess, G. K., Rawdon, H. S., Waltenberg, R. G., Observations on finishing temperatures and properties of rails. T 4, (1913-14) T38.
- Crowe, J. J., Waidner, C. W., Dickinson, H. C., Observations on ocean temperatures in the vicinity of the icebergs and in other parts of the ocean. B 10, 267 (1914) S210.
- Cruickshanks, B. C., Wenner, F., Nusbaum, G. W., Note on the electrical resistance of contacts between nuts and bolts. J 5, 757 (1930) RP227.
- Cummings, A. D., The influence of temperature on the evolution of hydrogen sulphide from vulcanized rubber. J 9, 163 (1932) RP464.
- Cummings, A. D., Jessup, E. S., Heats of combustion of rubber and of rubber-sulphur compounds. J 13, 357 (1934) RP713.
- Cummings, A. D., McPherson, A. T., Refractive index of rubber. J 14, 553 (1935) RP786.
- Curran, T. M., Gries, J. M., Present home financing methods. BH12. (1928).
- Curtis, H. J., McNicholas, H. J., Measurement of fiber diameters by the diffraction method. J 6, 717 (1931) RP300.
- Curtis, H. L.: Mica condensers as standards of capacity. B 6, 431 (1909-10) S137.
Insulating properties of solid dielectrics. B 11, 359 (1915) S234.
A vibration electrometer. B 11, 535 (1915) S239.
An integration method of deriving the alternating-current resistance and inductance of conductors. S 16, 93 (1920) S374.
Note on the ratio of the electromagnetic to the electrostatic unit of electricity as compared to the velocity of light. J 3, 63 (1929) RP83.
Review of recent absolute determinations of the ohm and the ampere. J 33, 235 (1944) RP1606.
- Curtis, H. L., Curtis, R. W., An absolute determination of the ampere. J 12, 665 (1934) RP685.
- Curtis, H. L., Curtis, R. W., Critchfield, C. L., An absolute determination of the ampere, using improved coils. J 22, 485 (1939) RP1200.
- Curtis, H. L., Duncan, R. C., A method for the accurate measurement of short-time intervals. S 19, 17 (1923-24) S470.

- Curtis, H. L., Grover, F. W.:
The measurement of the inductances of resistance coils. *B* 8, 455 (1912) S175.
Resistance coils for alternating current work. *B* 8, 495 (1912) S177.
- Curtis, H. L., Hartman, L. W., A dual bridge for the measurement of self inductance in terms of resistance and time. *J* 25, 1 (1940) RP1310.
- Curtis, H. L., McPherson, A. T., Dielectric constant, power factor, and resistivity of rubber and gutta-percha. *T* 19, 669 (1924-25) T299.
- Curtis, H. L., McPherson, A. T., Scott, A. H., Density and electrical properties of the system rubber-sulphur: Part II. Electrical properties of rubber-sulphur compounds. *S* 22, 383 (1927-28) S560.
- Curtis, H. L., Moon, C., Absolute measurement of capacitance by Maxwell's method. *S* 22, 487 (1927-28) S564.
- Curtis, H. L., Moon, C., Sparks, C. M.:
An absolute determination of the ohm. *J* 16, 1 (1936) RP857.
A determination of the absolute ohm, using an improved self inductor. *J* 21, 375 (1938) RP1137.
- Curtis, H. L., Scott, A. H.:
Change of electrical properties of rubber and gutta-percha during storage under water. *J* 5, 539 (1930) RP213.
Edge correction in the determination of dielectric constant. *J* 22, 747 (1939) RP1217.
- Curtis, H. L., Scott, A. H., McPherson, A. T., Effect of temperature and frequency on the dielectric constant, power factor, and conductivity of compounds of purified rubber and sulphur. *J* 11, 173 (1933) RP585.
- Curtis, H. L., Sparks, C. M., Formulas, tables, and curves for computing the mutual inductance of two coaxial circles. *S* 19, 541 (1923-24) S492.
- Curtis, H. L., Sparks, C. M., Hartshorn, L., Astbury, N. F., Capacitance and power factor of a mica capacitor as measured at the Bureau of Standards and the National Physical Laboratory. *J* 8, 507 (1932) RP431.
- Curtis, H. L., Wadleigh, W. H., Sellman, A. H., A camera for studying projectiles in flight. *T* 18, 189 (1924-25) T255.
- Curtis, R. W., Curtis, H. L., An absolute determination of the ampere. *J* 12, 665 (1934) RP685.
- Curtis, R. W., Curtis, H. L., Critchfield, C. L., An absolute determination of the ampere, using improved coils. *J* 22, 485 (1939) RP1200.
- Curtiss, L. F.:
Note on a mercury spark gap for instantaneous photography. *J* 3, 53 (1929) RP81.
A convenient form of Geiger tube counter. *J* 4, 593 (1930) RP165.
Probability of fluctuations in the rate of emission of α particles. *J* 4, 595 (1930) RP166.
The sensitive surface of the Geiger tube electron counter. *J* 4, 601 (1930) RP167.
A new method of analyzing α -ray photographs. *J* 4, 663 (1930) RP171.
The Geiger tube electron counter. *J* 5, 115 (1930) RP191.
A new apparatus for preparing Ra B + C sources. *J* 7, 215 (1931) RP339.
Fluctuations of the rate of emission of α -particles for weak sources and large solid angles. *J* 8, 339 (1932) RP419.
Simplified automatic Wilson chamber. *J* 8, 579 (1932) RP437.
A vacuum tube amplifier for feeble pulses. *J* 9, 115 (1932) RP461.
Deflection of cosmic rays by a magnetic field. *J* 9, 815 (1932) RP509.
The elimination of background "noise" in sensitive pulse amplifiers. *J* 10, 151 (1933) RP 522.
Temperature effect and its elimination in Geiger-Müller tube counters. *J* 10, 229 (1933) RP526.
A resistance-coupled amplifier for measuring ionization currents. *J* 10, 583 (1933) RP550.
A gamma-ray ionization chamber for use with a direct current amplifier. *J* 12, 167 (1934) RP641.
Portable detector for radium. *J* 12, 379 (1934) RP663.
A brightness meter for luminous preparations. *J* 13, 203 (1934) RP702.
Brightness meter for self-luminous dials. *J* 15, 1 (1935) RP804.
- Portable Geiger counter unit. *J* 21, 779 (1938) RP1154.
- Miniature Geiger-Müller counter. *J* 30, 157 (1943) RP1525.
- Protection of radium during air raids. H38. (1942).
- Curtiss, L. F., Brown, B. W.:
Frequency meter for use with Geiger-Müller counter. *J* 34, 53 (1945) RP1627.
Thin-walled aluminum beta-ray tube counters. *J* 35, 147 (1945) RP1666.
An arrangement with small solid angle for measurement of beta rays. *J* 37, 91 (1946) RP1731.
- Curtiss, R. F., Davis, F. J.:
Interval selector for random pulses. *J* 29, 405 (1942) RP1509.
A counting method for the determination of small amounts of radium and of radon. *J* 31, 181 (1943) RP1557.
- Curtiss, L. F., Feister, I., Disintegration of scandium¹⁶. *J* 38, 411 (1947) RP1781.
- Curtiss, L. F., Miller, L. C., A magnetic-lens electron spectrometer: radiations from 5.3 year cobalt⁶⁰. *J* 38, 359 (1947) RP1778.
- Curtis, R. W., Driscoll, R. L., Critchfield, C. L., An absolute determination of the ampere, using helical and spiral coils. *J* 23, 133 (1942) RP1449.

D

- Darnielle, R. B., Denison, I. A., Correlation of an electrolytic corrosion test with the actual corrosiveness of soils. *J* 21, 819 (1938) RP1157.
- Davies, G. L., Theory of design and calibration of vibrating reed indicators for radio range beacons. *J* 7, 195 (1931) RP338.
- Davies, G. L., Diamond, H., Characteristics of air-plane antennas for radio range-beacon reception. *J* 6, 901 (1931) RP313.
- Davies, G. L., Orton, W. H., Graphical determination of polar pattern of directional antenna systems. *J* 8, 555 (1932) RP435.
- Davis, F. J., An improved Geiger-counter arrangement for determination of radium content. *J* 38, 513 (1947) RP1792.
- Davis, F. J., Curtiss, L. F.:
Interval selector for random pulses. *J* 29, 405 (1942) RP1509.
A counting method for the determination of small amounts of radium and of radon. *J* 31, 181 (1943) RP1557.
- Davis, H. A., Wig, R. J., Value of the high-pressure steam test of portland cement. *T* 5, (1914-15) T47.
- Davis, R.:
A new method for the measurement of photographic filter factors. *S* 17, 79 (1922) S409.
The action of charred paper on the photographic plate and a method of deciphering charred records. *S* 18, 445 (1922-23) S454.
A nonintermittent sensitometer (time-scale exposure machine) with clock-controlled motor drive. *S* 20, 345 (1924-26) S511.
A special camera for photographing cylindrical surfaces. *S* 20, 515 (1924-26) S517.
A study of the relation between intermittent and nonintermittent sector wheel photographic exposures. *S* 21, 95 (1926-27) S528.
A correlated color temperature for illuminants. *J* 7, 659 (1931) RP365.
- Davis, R., Gibson, K. S.:
The relative spectral energy distribution and correlated color temperature of the N. P. L. white-light standard. *J* 7, 791 (1931) RP374.
Filters for producing the color of the equal-energy stimulus. *J* 12, 263 (1934) RP652.
Filters for the reproduction of sunlight and daylight and the determination of color temperature. M114 (1931).
- Davis, R., Neeland, G. K.:
An experimental study of several methods of representing photographic sensitivity. *J* 7, 495 (1931) RP355.
Variation of photographic sensitivity with different light sources. *J* 7, 843 (1931) RP378.
A comparison of several developers and the specification of relative sensitivity. *J* 11, 379 (1933) RP598.
- Davis, R., Stovall, Jr., E. J., Dimensional changes in aerial photographic films and papers. *J* 19, 613 (1937) RP1051.

- Davis, R., Walters, Jr., F. M.:*
Studies in color sensitive photographic plates and methods of sensitizing by bathing. S 17, 353 (1922) S422.
- Sensitometry of photographic emulsions and a survey of the characteristics of plates and films of American manufacture. S 18, 1 (1922-23) S439.
- Day, F. H., Singer, G., Wyckoff, H. O.,* Relative thickness of lead, concrete, and steel required for protection against narrow beams of X-rays. J 38, (1947) RP1806.
- deBruin, T. L., Humphreys, C. J., Meggers, W. F.:*
Regularities in the second spectrum of xenon. J 6, 287 (1931) RP275.
- The second spectrum of krypton. J 11, 409 (1933) RP599.
- Zeeman effect in the second and third spectra of xenon. J 23, 683 (1939) RP1264.
- de Bruin, T. L., Kiess, C. C.:*
The arc spectrum of chlorine and its structure. J 2, 1117 (1929) RP73.
- The arc spectrum of bromine and its structure. J 4, 667 (1930) RP172.
- Second spectrum of chlorine and its structure. J 23, 443 (1939) RP1244.
- de Bruin, T. L., Meggers, W. F.,* The arc spectrum of arsenic. J 3, 765 (1929) RP116.
- de Bruin, T. L., Meggers, W. F., Humphreys, C. J.:*
The first spectrum of krypton. J 3, 129 (1929) RP89.
- The first spectrum of xenon. J 3, 731 (1929) RP115.
- Further description and analysis of the first spectrum of krypton. J 7, 643 (1931) RP364.
- Defandorf, F. M., Brooks, H. B.,* An experimental study of the corona voltmeter. J 1, 589 (1928) RP21.
- Defandorf, F. M., Brooks, H. B., Silsbee, F. B.,* An absolute electrometer for the measurement of high alternating voltages. J 20, 253 (1938) RP1078.
- Defandorf, F. M., Silsbee, F. B.,* A transformer method for measuring high alternating voltages and its comparison with an absolute electrometer. J 20, 317 (1938) RP1079.
- De Groot, H. B., Hund, A.,* Radio-frequency resistance and inductance of coils used in broadcast reception. T 19, 651 (1924-25) T298.
- Deitz, V. R., Gleystein, L. F.:*
Determination of carbon and hydrogen in bone black and other chars. J 28, 795 (1942) RP1479.
- Surface available to nitrogen on bone black and other carbonaceous adsorbents. J 29, 191 (1942) RP1496.
- Hysteresis in the physical adsorption of nitrogen on bone char and other adsorbents. J 35, 285 (1945) RP1674.
- Dellinger, J. H.:*
The temperature coefficient of resistance of copper. B 7, 71 (1911) S147.
- High-frequency ammeters. B 10, 91 (1914) S206.
- Calculation of Planck's constant c . B 13, 535 (1916-17) S287.
- International system of electric and magnetic units. B 13, 599 (1916-17) S292.
- Principles of radio transmission and reception with antenna and coil aeriels. S 15, 435 (1919-20) S354.
- Sudden disturbances of the ionosphere. J 19, 111 (1937) RP1016.
- Dellinger, J. H., Buckingham, E.,* On the computation of the constant c of Planck's equation by an extension of Paschen's method of equal ordinates. B 7, 393 (1911) S162.
- Dellinger, J. H., Diamond, H., Dunmore, F. W.,* Development of the visual type radiobeacon system. J 4, 425 (1930) RP159.
- Dellinger, J. H., Jolliffe, C. B.,* Classification of radio subjects — An extension of the Dewey decimal system. C385 (1930).
- Dellinger, J. H., Jolliffe, C. B., Parkinson, T.,* Cooperative measurements of radio fading in 1925. S 22, 419 (1927-28) S561.
- Dellinger, J. H., Preston, J. L.:*
Methods of measurement of properties of electrical insulating materials. S 19, 39 (1923-24) S471.
- Properties of electrical insulating materials of the laminated phenolmethylene type. T 16, 501 (1921-22) T216.
- Dellinger, J. H., Whittemore, L. E., Kruse, S.,* A study of radio signal fading. S 19, 193 (1923-24) S476.
- Dellinger, J. H., Whittemore, L. E., Ould, R. S.,* Radio instruments and measurements. C74 (2d ed.), (1924).
- Dellinger, J. H., Wolff, F. A.,* The electrical conductivity of commercial copper. B 7, 103 (1911) S148.
- De Lollis, N. J., Kline, G. M., Reinhart, F. W., Rinker, R. C.,* Effect of catalysts and pH on strength of resin-bonded plywood. J 37, 281 (1946) RP1748.
- De Lollis, N. J., Manor, G. G., Acree, S. F.:*
Liquid-junction potentials, and relative activity coefficients of chloride ions, in concentrated mixed chlorides and nitrates at 25° C. J 33, 273, (1944) RP1608.
- Ionization constant of boric acid and the pH of certain borax-chloride buffer solutions from 0° to 60° C. J 33, 287 (1944) RP1609.
- Comparative liquid-junction potentials of some pH buffer standards and the calibration of pH meters. J 34, 115 (1945) RP1632.
- De Lollis, N. J., Manor, G. G., Lindall, P. W., Acree, S. F.,* Effect of sodium chloride on the apparent ionization constant of boric acid and the pH values of borate solutions. J 36, 543 (1946) RP1721.
- Denison, I. A.:*
Correlation of certain soil characteristics with pipe-line corrosion. J 7, 631 (1931) RP363.
- Methods for determining the total acidity of soils. J 10, 413 (1933) RP539.
- Electrolytic measurement of the corrosiveness of soils. J 17, 363 (1936) RP918.
- Denison, I. A., Darnielle, R. B.,* Correlation of an electrolytic corrosion test with the actual corrosiveness of soils. J 21, 819 (1938) RP1157.
- Denison, I. A., Hobbs, R. B.,* Corrosion of ferrous metals in acid soils. J 13, 125 (1934) RP696.
- Derry, A. T., Freeman, Jr., J. R.,* Effect of hot-rolling conditions on the physical properties of a carbon steel. T 18, 547 (1924-25) T267.
- de Sveshnikoff, W. W.,* Some factors affecting the life of machine-gun barrels. T 15 (1921) T191.
- de Sveshnikoff, W. W., Thompson, J. G.,* Deterioration of steels in the synthesis of ammonia. T 22, 199 (1927-28) T361.
- Devries, R. P.,* Comparison of five methods used to measure hardness. T 1, (1910-12) T11.
- Dewey, P. H., Harper, 3d., D. R.,* Heats of combustion of anthracite cokes, and of artificial and natural graphites. J 21, 457 (1938) RP1139.
- Diamond, H.:*
Applying the visual double-modulation type radio range to the airways. J 4, 265 (1930) RP148.
- The cause and elimination of night effects in radio range-beacon reception. J 10, 7 (1933) RP513.
- Performance tests of radio system of landing aids. J 11, 463 (1933) RP602.
- Diamond, H., Davies, G. L.,* Characteristics of airplane antennas for radio range-beacon reception. J 6, 901 (1931) RP313.
- Diamond, H., Dellinger, J. H., Dunmore, F. W.,* Development of the visual type radiobeacon system. J 4, 425 (1930) RP159.
- Diamond, H., Dunmore, F. W.:*
A course-shift indicator for the double-modulation type radiobeacon. J 3, 1 (1929) RP77.
- A radio-beacon and receiving system for blind landing of aircraft. J 5, 897 (1930) RP238.
- Experiments with underground ultra high-frequency antenna for airplane landing beam. J 19, 1 (1937) RP1006.
- Diamond, H., Gardner, F. G.,* Engine-ignition shielding for radio reception in aircraft. J 4, 415 (1930) RP158.
- Diamond, H., Hinman, Jr., W. S.,* An automatic weather station. J 25, 133 (1940) RP1318.
- Diamond, H., Hinman, Jr., W. S., Dunmore, F. W.,* A method for the investigation of upper-air phenomena and its application to radio meteorography. J 20, 369 (1938) RP1082.
- Diamond, H., Hinman, Jr., W. S., Dunmore, F. W., Lapham, E. G.,* An improved radio sonde and its performance. J 25, 327 (1940) RP1329.

- Diamond, H., Kear, F. G.*, A 12-course radio range for guiding aircraft with tuned reed visual indication. *J 4*, 351 (1930) RP154.
- Diamond, H., Norton, K. A., Lapham, E. G.*, On the accuracy of radio field-intensity measurement at broadcast frequencies. *J 21*, 795 (1938) RP1156.
- Diamond, H., Pratt, H.*, Receiving sets for aircraft beacon and telephony. *J 1*, 543 (1928) RP19.
- Diamond, P. T., Eden, M., Acree, S. F., Bates, R. G.*, Salt effects of potassium nitrate, sodium sulfate, and trisodium citrate on the activity coefficients of *p*-phenolsulfonate buffers. *J 37*, 251 (1946) RP1746.
- Dibeler, V. H.*, Ionization and dissociation of *cis*- and *trans*-2-butene by electron impact. *J 38*, 329 (1947) RP1775.
- Dibeler, V. H., Brewer, A. K.*, Mass spectrometric analyses of hydrocarbon and gas mixtures. *J 35*, 125 (1945) RP1664.
- Dibeler, V. H., Brewer, A. K., Madorsky, S. L., Taylor, J. K., Bradt, P., Parham, O. L., Britten, R. J., Reid, Jr., J. G.*, Concentration of isotopes of potassium by the counter-current electromigration method. *J 38*, 137 (1947) RP1765.
- Dibeler, V. H., Mohler, F. L., Reese, R. M.*, Mass spectrometer study of rare gases. *J 38*, 617 (1947) RP1799.
- Dickinson, H. C.*:
Treatment of high-temperature mercurial thermometers. *B 2*, 189 (1906) S32.
Combustion calorimetry and the heats of combustion of cane sugar, benzoic acid, and naphthalene. *B 11*, 189 (1915) S230.
- Dickinson, H. C., Harper, 3d, D. R., Osborne, N. S.*, Latent heat of fusion of ice. *B 10*, 235 (1914) S209.
- Dickinson, H. C., Mueller, E. F.*:
Calorimetric resistance thermometers and the transition temperature of sodium sulphate. *B 3*, 641 (1907) S68.
New calorimetric resistance thermometers. *B 9*, 483 (1913) S200.
- Dickinson, H. C., Mueller, E. F., George, E. B.*, Specific heat of some calcium chloride solutions between -35°C and $+20^{\circ}\text{C}$. *B 6*, 379 (1909-10) S135.
- Dickinson, H. C., Osborne, N. S.*:
An aneroid calorimeter. *B 12*, 23 (1915-16) S247.
Specific heat and heat of fusion of ice. *B 12*, 49 (1915-16) S248.
- Dickinson, H. C., Waidner, C. W.*, On the standard scale of temperature in the interval 0° to 100° . *B 3*, 663 (1907) S69.
- Dickinson, H. C., Waidner, C. W., Crowe, J. J.*, Observations on ocean temperatures in the vicinity of the icebergs and in other parts of the ocean. *B 10*, 267 (1914) S210.
- Dickinson, H. C., Waidner, C. W., Mueller, E. F., Harper, 3d, D. R.*, A Wheatstone bridge for resistance thermometry. *B 11*, 571 (1915) S241.
- Dickinson, J. A.*, Nomographs and charts for transmission lines. M176 (1944).
- Dickinson, J. A., Oakes, C. E.*, Results of a survey of elevator interlocks and an analysis of elevator accident statistics. *T 15*, (1921) T202.
- Dickson, G., Hidnert, P.*:
Thermal expansion of some industrial copper alloys. *J 31*, 77 (1943) RP1550.
Thermal expansion of high-silicon cast iron. *J 32*, 145 (1944) RP1581.
- Dieke, G. H., Meggers, W. F.*, Infra-red spectra of helium. *J 9*, 121 (1932) RP462.
- Digges, T. G.*:
Cutting tests with cemented tungsten carbide lathe tools. *J 5*, 365 (1930) RP206.
The influence of chemical composition and heat treatment of steel forgings on machinability with shallow lathe cuts. *J 6*, 977 (1931) RP319.
Effect of lathe cutting conditions on the hardness of carbon and alloy steels. *J 10*, 77 (1933) RP516.
Effect of carbon on the critical cooling rate of high-purity iron-carbon alloys and plain carbon steels. *J 20*, 571 (1938) RP1092.
Transformation of austenite on quenching high-purity iron-carbon alloys. *J 23*, 151 (1939) RP1225.
Influence of austenitic grain size on the critical cooling rate of high-purity iron-carbon alloys. *J 24*, 723 (1940) RP1308.
- Microstructural characteristics of high-purity alloys of iron and carbon. *J 27*, 65 (1941) RP1403.
- Digges, T. G., French, H. J.*, Turning with shallow cuts at high speeds. *J 3*, 829 (1929) RP120.
- Digges, T. G., Jordan, L.*, Hardening characteristics and other properties of commercial one-percent-carbon tool steels. *J 15*, 385 (1935) RP837.
- Digges, T. G., Rosenberg, S. J.*:
Effect of rate of heating through the transformation range on austenitic grain size. *J 25*, 215 (1940) RP1322.
Influence of initial structure and rate of heating on the austenitic grain size of 0.5-percent-carbon steels and iron-carbon alloy. *J 29*, 33 (1942) RP1481.
Metallographic study of the formation of austenite from aggregates of ferrite and cementite in an iron-carbon alloy of 0.5 percent carbon. *J 29*, 113 (1942) RP1489.
- Dill, R. S., Achenbach, P. R.*:
Effect of soot on the rating of an oil-fired heating boiler. BMS54 (1940).
Temperature distribution in a test bungalow with various heating devices. BMS108 (1947).
- Dill, R. S., Cottony, H. V.*:
Solar heating of various surfaces. BMS64 (1941).
Laboratory observations of condensation in wall specimens. BMS106 (1946).
- Dill, R. S., Peck, M. F., Phelan, V. B., Petersen, P. H.*, Structural, heat-transfer, and water-permeability properties of "Speedbrik" wall construction sponsored by the General Shale Products Corporation. BMS86 (1942).
- Dill, R. S., Robinson, W. C., Robinson, H. E.*, Measurement of heat losses from slab doors. BMS103 (1945).
- Dill, R. S., Whittemore, H. L., Phelan, V. B., Luxford, R. F.*, Structural and heat-transfer properties of "Multiple Box-Girder Plywood Panels" for walls, floors, and roofs sponsored by Loren H. Wittner. BMS99 (1943).
- Dill, R. S., Whittemore, H. L., Stang, A. H., Hubbell, E.*, Structural, heat-transfer, and water-permeability properties of five earth-wall constructions. BMS78 (1941).
- Dill, R. S., Whittemore, H. L., Stang, A. H., Phelan, V. B.*, Structural and heat-transfer properties of "U.S. S. Panelbilt" prefabricated sheet-steel constructions for walls, partitions, and roofs sponsored by the Tennessee Coal, Iron & Railroad Co. BMS74 (1941).
- Dixon, G., Hidnert, P.*, Some physical properties of mica. *J 35*, 309 (1945) RP1675.
- Donoghue, J. J., Hubbard, D.*, Thermal expansion studies of boric oxide glass and of crystalline boric oxide. *J 27*, 371 (1941) RP1425.
- Dorcas, M. J., Coblenz, W. W., Hughes, C. W.*, Radiometric measurements on the carbon arc and other light sources used in phototherapy. *S 21*, 535 (1926-27) S539.
- Dorsey, N. E.*:
Measurement of surface tension. *S 21*, 563 (1926-27) S540.
Supercooling and freezing of water. *J 20*, 799 (1938) RP1105.
- Dorsey, N. E., Rosa, E. B.*:
A new determination of the ratio of the electromagnetic to the electrostatic unit of electricity. *B 3*, 433 (1907) S65.
A comparison of the various methods of determining the ratio of the electromagnetic to the electrostatic unit of electricity. *B 3*, 605 (1907) S66.
- Dorsey, N. E., Rosa, E. B., Miller, J. M.*, A determination of the international ampere in absolute measure. *B 8*, 269 (1912) S171.
- Dowdell, R. L., Freeman, Jr., J. R., Berry, W. J.*, Endurance and other properties of rail steel. *T 22*, 269 (1927-28) T363.
- Dowdell, R. L., Kahlbaum, W., Tucker, W. A.*, The tensile properties of alloy steels at elevated temperatures as determined by the "short-time" method. *J 6*, 199 (1931) RP270.
- Dowdell, R. L., McCrae, J. V.*, Preliminary studies of the effect of deoxidation and mold conditions on the tensile properties of carbon steel castings. *J 5*, 265 (1930) RP199.
- Dowdell, R. L., McCrae, J. V., Jordan, L.*, A study of the so-called "over-reduced" condition in molten steel. *J 5*, 1123 (1930) RP250.

- Dowdell, R. L., Staples, E. M., Eggenschwiler, C. E.*, Bearing bronzes with additions of zinc, phosphorus, nickel, and antimony. J 5, 349 (1930) RP205.
- Drake, N. L., Kline, G. M.*, Polymerization of olefins formed by the action of sulphuric acid on methylisopropylcarbinol. J 13, 705 (1934) RP740.
- Drby, E. C.*:
The Planoflex, a simple device for evaluating the pliability of fabrics. J 27, 469 (1941) RP1434.
A friction meter for determining the coefficient of kinetic friction of fabrics. J 31, 237 (1943) RP1562.
- Driscoll, R. L., Curtis, R. W., Critchfield, C. L.*, An absolute determination of the ampere, using helical and spiral coils. J 28, 133 (1942) RP1449.
- Driscoll, R. L., Roth, F. L., Holt, W. L.*, Frictional properties of rubber. J 28, 439 (1942) RP1463.
- Dryden, H. L.*:
Air forces on circular cylinders, axes normal to the wind, with special reference to dynamical similarity. S 16, 489 (1920) S394.
Research on building materials and structures for use in low-cost housing. BMS1 (1938).
A reexamination of the Potsdam absolute determination of gravity. J 29, 303 (1942) RP1502.
- Dryden, H. L., Ballif, P. S.*:
The characteristics of two-blade propeller fans. J 5, 185 (1930) RP193.
Further measurements of propeller fan characteristics. J 6, 387 (1931) RP283.
- Dryden, H. L., Hill, G. C.*:
Wind pressures on structures. S 20, 697 (1924-26) S523.
Wind pressure on circular cylinders and chimneys. J 5, 653 (1930) RP221.
Wind pressure on a model of a mill building. J 6, 735 (1931) RP301.
Wind pressure on a model of the Empire State Building. J 10, 493 (1933) RP545.
- Dryden, H. L., Tuckerman, L. B.*, A propeller-vibration indicator. J 12, 537 (1934) RP678.
- Dryden, H. L., Tuckerman, L. B., Brooks, H. B.*, A method of exciting resonant vibrations in mechanical systems. J 10, 659 (1933) RP556.
- Duck, J. T., Bruce, C. S.*, Utilization of non-petroleum fuels in automotive engines. J 35, 439 (1945) RP1681.
- Duncan, R. C., Curtis, H. L.*, A method for the accurate measurement of short-time intervals. S 19, 17 (1923-24) S470.
- Dunkley, W. A., McBride, R. S., Crittenden, E. C., Taylor, A. H.*, The influence of quality of gas and other factors upon the efficiency of gas-mantle lamps. T 11, (1918-19) T110.
- Dunkley, W. A., McBride, R. S., Reinicker, C. E.*, Toluol recovery. T 11, (1918-19) T117.
- Dunmore, F. W.*:
A unicontrol high-frequency radio direction finder. S 21, 25 (1926-27) S525.
A portable radio direction finder for 90 to 7,700 kilocycles. S 21, 409 (1926-27) S536.
Design of tuned reed course indicators for aircraft radio-beacon. J 1, 751 (1928) RP28.
A tuned-reed course indicator for the 4 and 12 course aircraft radio range. J 4, 461 (1930) RP160.
A course indicator of pointer type for the visual radio range-beacon system. J 7, 147 (1931) RP 336.
A method of providing course and quadrant identification with the radio range-beacon system. J 11, 309 (1933) RP593.
Unicontrol radio receiver for ultra high frequencies using concentric lines as interstage couplers. J 15, 609 (1935) RP856.
An electric hygrometer and its application to radio meteorography. J 20, 723 (1938) RP1102.
An improved electric hygrometer. J 23, 701 (1939) RP1265.
- Dunmore, F. W., Dellinger, J. H., Diamond, H.*, Development of the visual type radiobeacon system. J 4, 425 (1930) RP159.
- Dunmore, F. W., Diamond, H.*:
A course-shift indicator for the double-modulation type radiobeacon. J 3, 1 (1929) RP77.
A radiobeacon and receiving system for blind landing of aircraft. J 5, 897 (1930) RP238.
- Experiments with underground ultra-high frequency antenna for airplane landing beam. J 19, 1 (1937) RP1006.
- Dunmore, F. W., Diamond, H., Hinman, Jr., W. S.*, A method for the investigation of upper-air phenomena and its application to radio meteorography. J 20, 369 (1938) RP1082.
- Dunmore, F. W., Diamond, H., Hinman, Jr., W. S., Lapham, E. G.*, An improved radio sonde and its performance. J 25, 327 (1940) RP1329.
- Dunmore, F. W., Engel, F. H.*:
Directive radio transmission on a wave length of 10 meters. S 19, 1 (1923-24) S469.
A directive type of radio beacon and its application to navigation. S 19, 281 (1923-24) S480.
- Dunmore, F. W., Kolster, F. A.*, The radio direction finder and its application to navigation. S 17, 529 (1922) S428.
- Dwyer, J. R., Hitchcock, F. A.*, Properties and manufacture of concrete building units. C304 (1926).
- E**
- Easton, A. H., Peck, M. F., Luxford, R. F.*, Structural properties of "Precision-Built, Jr." prefabricated wood-frame wall construction sponsored by the Homasote Co. BMS72 (1941).
- Eaton, H. N., Hunter, R. B., Golden, G. E.*, Cross-connections in plumbing systems. J 20, 479 (1938) RP1086.
- Eaton, H. N., Strother, D. H.*, A superheat meter or differential thermometer for airships. T 22, 171 (1927-28) T359.
- Eaton, H. N., Tuckerman, L. B., Keulegan, G. H.*, A fabric tension meter for use on aircraft. T 20, 581 (1925-26) T320.
- Eaton, H. N., Wilson, J. L., Henrikson, H. B.*, Use and testing of sphymomanometers. T 21, 729 (1926-27) T352.
- Eberle, A. R., McBurney, J. W.*, Strength, water absorption, and resistance to freezing and thawing of sand-lime brick. J 20, 67 (1938) RP1065.
- Ebert, J. P., Rossini, F. D., Pitzer, K. S., Taylor, W. J., Kilpatrick, J. E., Beckett, C. W., Williams, M. G., Werner, H. G.*, Tables of selected values of hydrocarbons. C461 (1947).
- Eckford, J. F., Coblenz, W. W.*:
Spectro-photo-electrical sensitivity of bournonite and pyrrgryrite. S 18, 353 (1922-23) S451.
Spectro-photo-electrical sensitivity of some halide salts of thallium, lead, and silver. S 18, 489 (1922-23) S456.
- Eckhardt, E. A., Chrisler, V. L.*, Transmission and absorption of sound by some building materials. S 21, 37 (1926-27) S526.
- Eckhardt, E. A., Chrisler, V. L., Quayle, P. P., Evans, M. J., Buckingham, E.*, Transmission of sound through voice tubes. T 21, 163 (1926-27) T333.
- Eckman, J. R.*, Determination of sulphur trioxide in the presence of sulphur dioxide, together with some analyses of commercial liquid sulphur dioxide. S 22, 277 (1927-28) S554.
- Eckman, J. R., Jordan, L.*:
Gases in metals: II. The determination of oxygen and hydrogen in metals by fusion in vacuum. S 20, 445 (1924-26) S514.
Gases in metals: III. The determination of nitrogen in metals by fusion in vacuum. S 22, 467 (1927-28) S563.
- Eckman, J. R., Rossini, F. D.*, The heat of formation of sulphur dioxide. J 3, 597 (1929) RP111.
- Edelstein, M., Bates, R. G., Acree, S. F.*, Reproducibility of the lead electrode and the electromotive force of the lead stick-lead amalgam cell at 0° to 60° C. J 36, 159 (1946) RP1697.
- Eden, M., Acree, S. F., Bates, R. G., Diamond, P. T.*, Salt effects of potassium nitrate, sodium sulfate, and trisodium citrate on the activity coefficients of *p*-phenolsulfonate buffers. J 37, 251 (1946) RP1746.
- Edwards, J. D.*:
Gas interferometer calibration. B 14, 473 (1918-19) S316.
Determination of ammonia in illuminating gas. T 4, (1913-14) T34.
A specific gravity balance for gases. T 9, (1916-17) T89.
Effusion method of determining gas density. T 9, (1916-17) T94.
Determination of permeability of balloon fabrics. T 11, (1918-19) T113.

- Application of the interferometer to gas analysis. T 12, (1919) T131.
- Edwards, J. D., Buckingham, E., Efflux of gases through small orifices. S 15, 573 (1919-20) S359.
- Edwards, J. D., Long, M. B., Effect of solar radiation upon balloons. T 12, (1919) T128.
- Edwards, J. D., McBride, R. S., Lead acetate test for hydrogen sulphide in gas. T 4, (1913-14) T41.
- Edwards, J. D., Pickering, S. F., Permeability of rubber to gases. S 16, 327 (1920) S387.
- Edwards, J. H., Whittemore, H. L., Stang, A. H.: Transverse tests of H-section column splices. J 4, 395 (1930) RP157.
- Compressive tests of bases for subway columns. J 5, 619 (1930) RP218.
- Strength of welded shelf-angle connections. J 5, 781 (1930) RP230.
- Stress distribution in welded steel pedestals. J 5, 803 (1930) RP232.
- Compressive tests of jointed H-section steel columns. J 6, 305 (1931) RP277.
- Eggenschwiler, C. E.: Effect of casting temperature and of additions of iron on bearing bronze (Cu 80: Sn 10: Pb 10). J 8, 67 (1932) RP401.
- Effect of antimony on the mechanical properties of a bearing bronze (Cu 80: Sn 10: Pb 10). J 8, 625 (1932) RP442.
- Eggenschwiler, C. E., Staples, E. M., Dowdell, R. L., Bearing bronzes with additions of zinc, phosphorus, nickel, and antimony. J 5, 349 (1930) RP205.
- Eichlin, A. S., Fastness of dyed fabrics to dry cleaning. J 3, 39 (1929) RP80.
- Eichlin, C. G., Tool, A. Q., Variations caused in heating curves of glass by heat treatment. J 6, 523 (1931) RP292.
- Eickhoff, A. J., Hunter, R. S., Measurement of the fading rate of paints. J 28, 773 (1942) RP1478.
- Eickhoff, A. J., Judd, D. B., Harrison, W. N., Sweo, B. J., Hickson, E. F., Shaw, M. B., Paffenbarger, G. C., Optical specification of light-scattering materials. J 19, 287 (1937) RP1026.
- Eiseman, J. H., Cautions regarding gas-appliance attachments. C404 (1934).
- Eiseman, J. H., Berry, W. M., Brumbaugh, I. V., Moulton, G. F., Shawn, G. B., Relative usefulness of gases of different heating value and adjustments of burners for changes in heating value and specific gravity. T 17, 15 (1922-24) T222.
- Eiseman, J. H., Smith, F. A.: Effect of the depth of drilled ports on the limits of operation of domestic gas burners. J 18, 485 (1937) RP988.
- Saturation of gases by laboratory wet test meters. J 23, 345 (1939) RP1238.
- Eiseman, J. H., Smith, F. A., Creitz, E. C., Tests of instruments for the determination, indication, or recording of the specific gravities of gases. M177 (1947).
- Eiseman, J. H., Smith, F. A., Merritt, C. J., The effect of altitude on the limits of safe operation of gas appliances. J 10, 619 (1933) RP553.
- Eiseman, J. H., Weaver, E. R., Shawn, G. B., A method for testing gas appliances to determine their safety from producing carbon monoxide. T 20, 125 (1925-26) T304.
- Eiseman, J. H., Weaver, E. R., Smith, F. A., A method for determining the most favorable design of gas burners. J 8, 699 (1932) RP446.
- Ellinger, G. A., Thermomagnetic investigation of tempering of quenched 0.75 per cent carbon steel. J 7, 441 (1931) RP350.
- Ellinger, G. A., Bibber, L. C., Laboratory corrosion tests of welded low-carbon stainless steel. J 18, 69 (1937) RP963.
- Ellinger, G. A., Bissell, A. G., Williams, M. L., The tee-bend test to compare the welding quality of steels. J 28, 1 (1942) RP1444.
- Ellinger, G. A., Sanford, R. L., Prolonged tempering at 100° C and aging at room temperature of 0.8 percent carbon steel. J 13, 259 (1934) RP707.
- Elliot, M. A., Acree, S. F., Polar structure of some benzoin indicators. J 23, 675 (1939) RP1263.
- Elliott, M. A., Sklar, A. L., Acree, S. F., Rapid method for determining ascorbic acid concentration. J 26, 117 (1941) RP1364.
- Emerson, W. B., Compressibility of fused-quartz glass at atmospheric pressure. J 18, 683 (1937) RP1003.
- Emerson, W. B., Coblenz, W. W.: Studies of instruments for measuring radiant energy in absolute value: An absolute thermopile. B 12, 503 (1915-16) S261.
- Distribution of energy in the visible spectrum of an acetylene flame. B 13, 355 (1916-17) S279.
- Relative sensibility of average eye to light of different colors and some practical applications to radiation problems. B 14, 167 (1918-19) S303.
- Luminous radiation from a black body and mechanical equivalent of light. B 14, 255 (1918-19) S305.
- The reflecting power of tungsten and stellite. B 14, 307 (1918-19) S308.
- Glasses for protecting eyes from injurious radiations. T 9, (1916-17) T93.
- Emerson, W. B., Coblenz, W. W., Long, M. B., Spectroradiometric investigation of the transmission of various substances. B 14, 653 (1918-19) S325.
- Emerson, W. B., Knoop, F., Peters, C. G., A sensitive pyramidal-diamond tool for indentation measurements. J 23, 39 (1939) RP1220.
- Emerson, W. B., Nefflen, E., Harris, F. K., Cooter, I. L., Peters, C. G., Electrical methods for diamond-die production. J 38, 449 (1947) RP1787.
- Emley, A. L., Kimberly, A. E.: A study of the deterioration of book papers in libraries. M140 (1933).
- A study of the removal of sulphur dioxide from library air. M142 (1933).
- Emley, W. E.: The manufacture of lime. T 2, (1912-14) T16.
- Manufacture and properties of sand-lime brick. T 9, (1916-17) T85.
- Measurement of plasticity of mortars and plasters. T 13, (1919-20) T169.
- Emley, W. E., Bowker, R. C., Comparative wear of chrome-tanned, vegetable-tanned, and retanned sole leather. J 15, 363 (1935) RP834.
- Emley, W. E., Faxon, C. F., Colored wall plaster. T 14, (1920-21) T181.
- Emley, W. E., Hofer, C. E., Tests of floor coverings for post-office workrooms. J 19, 567 (1937) RP1046.
- Emley, W. E., Porter, J. M., Manufacture of lime. C337 (1927).
- Emley, W. E., Sweeney, O. R., Manufacture of insulating board from cornstalks. M112 (1930).
- Emley, W. E., Wig, R. J., Pearson, J. C., Durability of stucco and plaster construction. T 7, (1916-17) T70.
- Engel, F. H., Dunmore, F. W.: Directive radio transmission on a wave length of 10 meters. S 19, 1 (1923-24) S469.
- A directive type of radio beacon and its application to navigation. S 19, 281 (1923-24) S480.
- Epstein, S., Buckley, J. P., Metallographic polishing. I. Automatic metallic photographic polishing machine. J 3, 783 (1929) RP117.
- Epstein, S., Cross, H. C., Groesbeck, E. C., Wymore, I. J., Observations on the iron-nitrogen system. J 3, 1005 (1929) RP126.
- Epstein, S., Rawdon, H. S.: The structure of martensitic carbon steels and the changes in microstructure which occur upon tempering. S 18, 373 (1922-23) S452.
- Metallographic features revealed by the deep etching of steel. T 13, (1919-20) T156.
- The nick-bend test for wrought iron. T 18, 115 (1924-25) T252.
- Steel for casehardening — Normal and abnormal steel. J 1, 423 (1928) RP14.
- Epstein, S. W., Gongo, B. L., Extraction of rubber goods. T 13, (1919-20) T162.
- Epstein, S. W., Moore, R. L., Determination of cellulose in rubber goods. T 13, (1919-20) T154.
- Epstein, S. W., Smith, A. H., The determination of free carbon in rubber goods. T 12, (1919) T136.
- Evans, D. N., Geller, R. F., A study of some ceramic bodies of low absorption maturing at temperatures below 1,000° C. J 9, 473 (1932) RP483.
- Evans, D. N., Geller, R. F., Creamer, A. S., Effects of particle size of a potter's "flint" and a feldspar in whiteware. J 11, 327 (1933) RP594.

- Evans, M. J., Eckhardt, E. A., Christer, V. L., Quayle, P. P., Buckingham, E., Transmission of sound through voice tubes. *T 21*, 163 (1926-27) T333.
- Evans, W. D., Critchfield, C. L., The effect of atmospheric moisture on the physical properties of vegetable and chrome tanned calf leathers. *J 11*, 147 (1933) RP583.
- Everhart, J. L., and others, Mechanical properties of metals and alloys. *C 447* (1943).
- Ewell, R. H., Bunting, E. N., Geller, R. F., Thermal decomposition of talc. *J 15*, 551 (1935) RP848.
- Ewell, R. H., Insley, H.: Thermal behavior of the kaolin minerals. *J 14*, 615 (1935) RP792.
- Hydrothermal synthesis of kaolinite, dickite, beidellite, and nontronite. *J 15*, 173 (1935) RP819.
- Ewing, S. P., Logan, K. H., Soil-corrosion studies, 1934. Field tests of nonbituminous coatings for underground use. *J 18*, 361 (1937) RP982.
- Ewing, S. P., Logan, K. H., Yeomans, C. D., Bureau of Standards soil-corrosion studies. I. Soils, materials, and results of early observations. *T 22*, 447 (1927-28) T368.
- Executive Committee for the American Standard Safety Code for Elevators, Dumbwaiters, and Escalators:
- Elevator wire rope maintenance. *C 441* (1942).
- Maintenance of elevator mechanical safety appliances. *C 442*. (1943).
- Maintenance of elevator hoistway and car enclosures and equipment. *C 443* (1943).
- Maintenance of elevator hoisting machines and brakes. *C 444*, (1943).
- F**
- Fahlman, E. G., Anderson, R. J.: Development of a method for measurement of internal stress in brass tubing. *T 18*, 229 (1924-25) T257.
- Release of internal stress in brass tubing. *T 19*, 235 (1924-25) T285.
- Faick, C. A., Finn, A. N., The index of refraction of some soda-lime-silica glasses as a function of the composition. *J 6*, 993 (1931) RP320.
- Faick, C. A., Fonoroff, B., A precision apparatus for the rapid determination of indices of refraction and dispersion by immersion. *J 32*, 67 (1944) RP1575.
- Faick, C. A., Stair, R., Infrared absorption of some experimental glasses containing rare earth and other oxides. *J 38*, 95 (1947) RP1761.
- Faick, C. A., Young, J. C., Glaze, F. W., Finn, A. N., Density of some soda-potash-silica glasses as a function of the composition. *J 22*, 453 (1939) RP1197.
- Faick, C. A., Young, J. C., Hubbard, D., Finn, A. N.: Index of refraction, density, and thermal expansion of some soda-alumina-silica glasses as functions of the composition. *J 14*, 133 (1935) RP762.
- Fairchild, C. O., Foote, P. D., Luminosity of a black body and temperature. *B 13*, 137 (1916-17) S270.
- Fairchild, C. O., Foote, P. D., Harrison, T. R., Pyrometric practice. *T 14*, (1920-21) T170.
- Fairchild, C. O., Hoover, W. H., Peters, M. F., A new determination of the melting point of palladium. *J 2*, 733 (1929) RP65.
- Fairchild, I. J.: Holding power of wood screws. *T 20*, 553 (1925-26) T319.
- Organizations cooperating with the National Bureau of Standards. *M 96* (1927).
- The grade terminology problem. *M 173* (1943).
- Farber, H. L., Blum, W., Throwing power in chromium plating. *J 4*, 27 (1930) RP131.
- Fawcett, E. H., Acree, S. F., Stabilization of boric acid buffers by aeration. *J 6*, 757 (1931) RP302.
- Faxon, C. F., Emley, W. E., Colored wall plaster. *T 14*, (1920-21) T181.
- Fearing, J. L., Agnew, P. G., Stannard, W. H., A system of remote control for an electric testing laboratory. *B 13*, 581 (1916-17) S291.
- Feister, I., Curtiss, L. F., Disintegration of scandium¹⁶. *J 38*, 411 (1947) RP1781.
- Ferguson, L. R., Wig, R. J., Williams, G. M., Finn, A. N., McCrory, S. H., Bebb, E. C., Durability of cement drain tile and concrete in alkali soils. *T 9*, (1916-17) T95.
- Ferguson, L. R., Wig, R. J., Williams, G. M., McCrory, S. H., Bebb, E. C., Investigation of the durability of cement drain tile in alkali soils. *T 5*, (1914-15) T44.
- Ferguson, W. F. C., The chromium oxide and the vanadium oxide band spectra. *J 8*, 381 (1932) RP423.
- Ferguson, W. J., Rands, Jr., R. D., Prather, J. L., Specific heat and increases of entropy and enthalpy of the synthetic rubber GR-S from 0° to 330° K. *J 33*, 63, (1944) RP1595.
- Ferguson, W. J., Scott, R. B., Brickwedde, F. G., Thermodynamic properties of *cis*-2-butene from 15° to 1,500° K. *J 33*, 1, (1944) RP1592.
- Fewell, W. C.: Scientific and technical positions in the National Bureau of Standards. *M 94* (1929).
- Scientific and technical positions in the National Bureau of Standards. *M 152* (1935).
- Scientific and technical positions in the National Bureau of Standards. *M 163* (1939).
- Finck, J. L., Mechanism of heat flow in fibrous materials. *J 5*, 973 (1930) RP243.
- Finck, J. L., Van Dusen, M. S., Heat transfer through building walls. *J 6*, 493 (1931) RP291.
- Finkelstein, J. L., Wilhelm, R. M., A standardized method for the determination of solidification points, especially of naphthalene and paraffin. *S 15*, 185 (1919-20) S340.
- Finn, A. N., Making a glass disk for a 70 inch telescope reflector. *J 3*, 315 (1929) RP97.
- Finn, A. N., Faick, C. A., The index of refraction of some soda-lime-silica glasses as a function of the composition. *J 6*, 993 (1931) RP320.
- Finn, A. N., Faick, C. A., Young, J. C., Hubbard, D., Index of refraction, density, and thermal expansion of some soda-alumina-silica glasses as functions of the composition. *J 14*, 133 (1935) RP762.
- Finn, A. N., Glaze, F. W.: Routine determination of boron in glass. *J 16*, 421 (1936) RP882.
- An improvement in the "partition method" for the determination of boron. *J 27*, 33 (1941) RP1401.
- Finn, A. N., Glaze, F. W., Young, J. C., The density of some soda-lime-silica glasses as a function of the composition. *J 9*, 799 (1932) RP507.
- Finn, A. N., Hahner, C., Voigt, G. Q., Gases in some optical and other glasses. *J 19*, 95 (1937) RP1014.
- Finn, A. N., Hubbard, D., Hamilton, E. H., Effect of the solubility of glass on the behavior of the glass electrode. *J 22*, 339 (1939) RP1187.
- Finn, A. N., Klekotka, J. F., On a modified method for decomposing aluminous silicates for chemical analysis. *J 4*, 809 (1930) RP180.
- Finn, A. N., Merica, P. D., Waltenberg, R. G., Mechanical properties and resistance to corrosion of rolled light alloys of aluminum and magnesium with copper, with nickel, and with manganese. *T 12*, (1919) T132.
- Finn, A. N., Schmid, B. C., Young, J. C., Thermal expansions of some soda-lime-silica glasses as functions of the composition. *J 12*, 421 (1934) RP667.
- Finn, A. N., Tilton, L. W., Tool, A. Q., Cause and removal of certain heterogeneities in glass. *S 22*, 719 (1927-28) S572.
- Finn, A. N., Wuchers, E., Clabaugh, W. S., Comparative tests of chemical glassware. *J 26*, 537 (1941) RP1394.
- Finn, A. N., Wig, R. J., Williams, G. M., McCrory, S. H., Bebb, E. C., Ferguson, L. R., Durability of cement drain tile and concrete in alkali soils. *T 9*, (1916-17) T95.
- Finn, A. N., Young, J. C., Effect of composition and other factors on the specific refraction and dispersion of glasses. *J 25*, 759 (1940) RP1352.
- Finn, A. N., Young, J. C., Glaze, F. W., Faick, C. A., Density of some soda-potash-silica glasses as a function of the composition. *J 22*, 453 (1939) RP1197.
- Fiock, E. F., A review of calorimetric measurements on thermal properties of saturated water and steam. *J 5*, 481 (1930) RP210.

- Fiock, E. F., Caldwell, F. R.*, Some factors influencing the performance of diaphragm indicators of explosion pressure. J 26, 175 (1941) RP1368.
- Fiock, E. F., Ginnings, D. C.*, Heat of vaporization of water at 50°, 70°, and 90° C. J 8, 321 (1932) RP416.
- Fiock, E. F., Ginnings, D. C., Holton, W. B.*, Calorimetric determinations of thermal properties of methyl alcohol, ethyl alcohol, and benzene. J 6, 881 (1931) RP312.
- Fiock, E. F., Osborne, N. S., Stimson, H. F.*, A calorimetric determination of thermal properties of saturated water and steam from 0° to 270° C. J 5, 411 (1930) RP209.
- Fiock, E. F., Osborne, N. S., Stimson, H. F., Ginnings, D. C.*, The pressure of saturated water vapor in the range 100° to 374° C. J 10, 155 (1933) RP523.
- Fischer, L. A.*:
 Recombination of the United States prototype meter. B 1, 5 (1903-05) S1.
 History of the standard weights and measures of the United States. B 1, 365 (1903-05) S17.
 History of the standard weights and measures of the United States. M64 (1925).
- Fischer, L. A., Hubbard, H. D.*, Laws concerning the weights and measures of the United States. M20 (1st ed.), (1904).
- Fischer, L. A., Waidner, C. W.*, The testing of clinical thermometers. B 1, 275 (1903-05) S13.
- Fischer, M. F.*:
 Apparatus for the determination of the magnetic properties of short bars. S 13, 513 (1922-23) S458.
 Notes on the effect of repeated stresses on the magnetic properties of steel. J 1, 721 (1928) RP26.
- Fishburn, C. C.*:
 Effects of wetting and drying on the permeability of masonry walls. BMS55 (1940).
 Water permeability of walls built of masonry units. BMS82 (1942).
 Water permeability and weathering resistance of stucco-faced, gunite-faced, and "Knap Concrete Unit" walls. BMS94 (1942).
 Strength and resistance to corrosion of ties for cavity walls. BMS101 (1943).
- Fishburn, C. C., Nagle, J. L.*, Tests on a reinforced-concrete arch of the Arlington Memorial Bridge. J 11, 567 (1933) RP609.
- Fishburn, C. C., Parsons, D. E.*, Tests of cement-water paints and other waterproofings for unit-masonry walls. BMS95 (1943).
- Fishburn, C. C., Parsons, D. E., Petersen, P. H.*, Effect of outdoor exposure on the water permeability of masonry walls. BMS76 (1941).
- Fishburn, C. C., Petersen, P. H.*, Effect of heating and cooling on the permeability of masonry walls. BMS41 (1940).
- Fishburn, C. C., Watstein, D., Parsons, D. E.*, Water permeability of masonry walls. BMS7 (1938).
- Fishburn, C. C., Whittemore, H. L., Stang, A. H.*:
 Structural properties of one of the "Keystone beam steel floor" constructions sponsored by the H. H. Robertson Company. BMS10 (1938).
- Structural properties of a "Tilecrete" floor construction sponsored by Tilecrete Floors, Inc., BMS16 (1939).
- Structural properties of a reinforced-brick wall construction and a brick-tile cavity-wall construction sponsored by the Structural Clay Products Institute. BMS24 (1939).
- Structural properties of "Nelson Pre-Cast Concrete Foundation" wall construction sponsored by the Nelson Cement Stone Company, Inc., BMS26 (1939).
- Structural properties of a wall construction of "Knap Concrete Wall Units" sponsored by Knap America, Inc., BMS40 (1940).
- Fisher, J. V. S., Lloyd, M. G.*:
 An apparatus for determining the wave form of magnetic flux. B 4, 467 (1907-08) S87.
 The testing of transformer steel. B 5, 453 (1908-09) S109.
- Fisher, R. T., Schoffstall, C. W.*, Development of the standard numbered cotton duck specification: study of methods of tests and tolerances. T 18, 443 (1924-25) T264.
- Fitch, T. T., Agnew, P. G.*, The determination of the constants of instrument transformers. B 6, 281 (1909-10) S130.
- Fitch, T. T., Huber, C. J.*:
 A comparison of American direct-current switch-board voltmeters and ammeters. B 7, 407 (1911) S163.
 A comparative study of American direct-current watt-hour meters. B 10, 161 (1914) S207.
- Flanagan, H. F., Sedlak, V. A., Willingham, C. B., Rossini, F. D., Streiff, A. J., Murphy, E. T., Cahill, J. C.*, Purification, purity, and freezing points of 8 nonanes, 11 alkylcyclopentanes, 6 alkylcyclohexanes, and 4 butylbenzenes of the API-Standard and API-NBS series. J 33, 53 (1947) RP1760.
- Flinn, R. H., Shepherd, M., Schuhmann, S., Hough, J. W., Neal, P. A.*, Hazard of mercury vapor in scientific laboratories. J 26, 357 (1941) RP1383.
- Flinn, E. P., Clarke, W. F., Newman, E. S., Shartsis, L., Bishop, D. L., Wells, L. S.*, Extraction of alumina from clays and high-silica bauxites. J 36, 63 (1946) RP1691.
- Flinn, E. P., Insley, H., Newman, E. S., Swenson, J. A.*, Relation of compositions and heats of solution of portland cement clinker. J 21, 355 (1938) RP1135.
- Flinn, E. P., McMurdie, H. F.*, X-ray patterns of hydrated calcium silicates. J 31, 225 (1943) RP1560.
- Flinn, E. P., McMurdie, H. F., Wells, L. S.*:
 Formation of hydrated calcium silicates at elevated temperatures and pressures. J 21, 617 (1938) RP1147.
 Hydrothermal and X-ray studies of the garnet-hydrogarnet series and the relationship of the series to hydration products of portland cement. J 26, 13 (1941) RP1355.
- Flinn, E. P., Swenson, J. A.*, Distribution of compounds in portland cement. J 17, 261 (1936) RP910.
- Flinn, E. P., Wells, L. S.*:
 The activity coefficients of hydroxyl ion in solutions of calcium hydroxide at 30° C. J 11, 163 (1933) RP584.
 Study of the system $\text{CaO-SiO}_2\text{-H}_2\text{O}$ at 30° C and of the reaction of water on the anhydrous calcium silicates. J 12, 751 (1934) RP687.
 The system lime-boric oxide-silica. J 17, 727 (1936) RP941.
 Relationship of the garnet-hydrogarnet series to the sulfate resistance of portland cements. J 27, 171 (1941) RP1411.
 Analogy of hydrated calcium silicoaluminates and hexacalcium aluminate to hydrated calcium sulfoaluminates. J 33, 471, (1944) RP1623.
- Fonoroff, B., Faick, C. A.*, A precision apparatus for the rapid determination of indices of refraction and dispersion by immersion. J 32, 67 (1944) RP1575.
- Fookson, A., Pomerantz, P., Brooks, D. B., Howard, F. L., Mears, T. W.*, Preparation and physical properties of several aliphatic hydrocarbons and intermediates. J 33, 365 (1947) RP1779.
- Footo, P. D.*:
 Note on cold-junction corrections for thermocouples. B 9, 553 (1913) S202.
 The emissivity of metals and oxides. III. The total emissivity of platinum and the relation between total emissivity and resistivity. B 11, 607 (1915) S243.
 A new relation derived from Planck's law. B 12, 479 (1915-16) S259.
 "Center of gravity" and "Effective wave length" of transmission of pyrometer color screens, and the extrapolation of the high temperature scale. B 12, 483 (1915-16) S260.
 Illumination from a radiating disk. B 12, 583 (1915-16) S263.
 Some characteristics of the Marvin pyrheliometer. B 14, 605 (1918-19) S323.
- Footo, P. D., Burgess, G. K.*:
 The emissivity of metals and oxides. I. Nickel oxide (NiO) in the range 600 to 1300° C. B 11, 41 (1915) S224.
 The emissivity of metals and oxides. IV. Iron oxide. B 12, 83 (1915-16) S249.
 Characteristics of radiation pyrometers. B 12, 91 (1915-16) S250.

- Foote, P. D., Fairchild, C. O., Luminosity of a black body and temperature. B 13, 137 (1916-17) S270.*
Foote, P. D., Fairchild, C. O., Harrison, T. R., Pyrometric practice. T 14, (1920-21) T170.
Foote, P. D., Meggers, W. F.: A new microphotometer for photographic densities. S 16, 299 (1920) S385.
Atomic theory and low-voltage arcs in caesium vapor. S 16, 309 (1920) S386.
Foote, P. D., Mohler, F. L.: Ionization and resonance potentials of some non-metallic elements. S 16, 669 (1920) S400.
Characteristic soft X-rays from arcs in gases and vapors. S 17, 471 (1922) S425.
Foote, P. D., Mohler, F. L., Meggers, W. F., Resonance potentials and low-voltage arcs for metals of the second group of the periodic table. S 16, 725 (1920) S403.
Foote, P. D., Mohler, F. L., Stimson, H. F., Ionization and resonance potentials for electrons in vapors of lead and calcium. S 15, 723 (1919-20) S368.
Foote, P. D., Ruark, A. E., Mohler, F. L., Chenault, R. L., Spectra and critical potentials of fifth group elements. S 19, 463 (1923-24) S490.
Foote, P. D., Tate, J. T., Resonance and ionization potentials for electrons in cadmium vapor. B 14, 479 (1918-19) S317.
Forman, N. L., Silsbee, F. B., Smith, R. L., Park, J. H., Equipment for testing current transformers. J 11, 93 (1933) RP580.
Forziati, A. F., Glasgow, Jr., A. R., Willingham, C. B., Rossini, F. D., Purification and properties of 29 paraffin, 4 alkylcyclopentane, 10 alkylcyclohexane, and 8 alkylbenzene hydrocarbons. J 36, 129 (1946) RP1695.
Forziati, A. F., Mair, B. J.: Analytical determination of aromatic hydrocarbons by adsorption. J 32, 151 (1944) RP1582.
Separation and recovery of aromatic hydrocarbons from paraffins and naphthenes by adsorption. J 32, 165 (1944) RP1583.
Forziati, A. F., Mair, B. J., Rossini, F. D., Assembly and calibration of a density balance for liquid hydrocarbons. J 35, 518 (1945) RP1685.
Forziati, A. F., Willingham, C. B., Mair, B. J., Rossini, F. D., Hydrocarbons in the gasoline fraction of seven representative crudes, including all the distillate to 102° C and the aromatics to 160° C. J 32, 11 (1944) RP1571.
Foskett, L. W., Laufer, M. K., Daytime photoelectric measurement of cloud heights. J 26, 331 (1941) RP1379.
Foster, H. D., Ingberg, S. H., Fire resistance of hollow load-bearing wall tile. J 2, 1 (1929) RP37.
Foster, H. D., Stang, A. H., Parsons, D. E., Compressive and transverse strength of hollow tile-walls. T 20, 317 (1925-26) T311.
Fourt, L., Harris, M., Mizell, L. R., Elasticity of wool as related to its chemical structure. J 29, 73 (1942) RP1486.
Fowler, R. M., Bright, H. A.: Determination of aluminum in nitriding steels by the use of 8-hydroxyquinoline. J 10, 327 (1933) RP533.
Standardization of permanganate solutions with sodium oxalate. J 15, 493 (1935) RP843.
Fox, J. F., Souder, W., Hidnerl, P., Autographic thermal expansion apparatus. J 13, 497 (1934) RP722.
France, R. D., Freeman, Jr., J. R.: Comparative cold-rolling tests of open-hearth steel strip (deep drawing stock) and electrolytic iron strip. T 19, 297 (1924-25) T288.
Endurance properties of some special rail steels. J 4, 851 (1930) RP182.
France, R. D., Swanger, W. H., Effect of zinc coatings on the endurance properties of steel. J 9, 9 (1932) RP454.
Frandsen, M.: Cryoscopic constant, heat of fusion, and heat capacity of camphor. J 7, 477 (1931) RP353.
The heat capacity, heat of sublimation, and heat of solution of phosphorus pentoxide. J 10, 35 (1933) RP514.
Frandsen, M., Rossini, F. D., The calorimetric determination of the intrinsic energy of gases as a function of the pressure. Data on oxygen and
it mixtures with carbon dioxide to 40 atmospheres, at 28° C. J 9, 733 (1932) RP503.
Frandsen, M., Washburn, E. W., Smith, E. R., The isotopic fractionation of water. J 11, 453 (1933) RP601.
Frankland, J. M., Whittemore, H. L., Tests of cellular sheet-steel flooring. J 9, 131 (1932) RP463.
Freeman, Jr., J. R., Derry, A. T., Effect of hot-rolling conditions on the physical properties of a carbon steel. T 18, 547 (1924-25) T267.
Freeman, Jr., J. R., Doudell, R. L., Berry, W. J., Endurance and other properties of rail steel. T 22, 269 (1927-28) T363.
Freeman, Jr., J. R., France, R. D.: Comparative cold-rolling tests of open-hearth steel strip (deep drawing stock) and electrolytic iron strip. T 19, 297 (1924-25) T288.
Endurance properties of some special rail steels. J 4, 851 (1930) RP182.
Freeman, Jr., J. R., Merica, P. D., Wallenberg, R. G., Constitution and metallography of aluminum and its light alloys with copper and with magnesium. S 15, 105 (1919-20) S337.
Freeman, Jr., J. R., Quick, G. W., Tensile properties of rail and some other steels at elevated temperatures. J 4, 549 (1930) RP164.
Freeman, Jr., J. R., Scherrer, J. A., Rosenberg, S. J., Reliability of fusible tin boiler plugs in service. J 4, 1 (1930) RP129.
Freeman, Jr., J. R., Scott, H., Use of a modified Rosenhain furnace for thermal analysis. S 15, 317 (1919-20) S348.
Freeman, Jr., J. R., Sillers, Jr., F., Brandt, P. F., Pure zinc at normal and elevated temperatures. S 20, 661 (1924-26) S522.
Freeman, Jr., J. R., Solakian, H. N., Effect of service on the endurance properties of rail steel. J 3, 205 (1929) RP92.
Freeman, Jr., J. R., Woodward, R. W., Some properties of white metal bearing alloys at elevated temperatures. T 15, (1921) T188.
Frehofer, M. K., Gibson, K. S., McNicholas, H. J., Tyndall, E. P. T., Mathewson, W. E., The spectral transmissive properties of dyes: I. Seven permitted food dyes, in the visible, ultra-violet, and near infra-red. S 18, 121 (1922-23) S440.
Frehofer, M. K., Snow, C. L., Tables and graphs for facilitating the computation of spectral energy distribution by Planck's formula. M56 (1925).
French, H. J.: Tensile properties of some structural alloy steels at high temperatures. T 16, 77 (1921-22) T205.
Effect of temperature, deformation, and rate of loading on the tensile properties of low-carbon steel below the thermal critical range. T 16, 679 (1921-22) T219.
A recording chronograph for the inverse rate method of thermal analysis. T 17, 245 (1922-24) T230.
French, H. J., Cross, H. C., Peterson, A. A., Creep in five steels at different temperatures. T 22, 235 (1927-28) T362.
French, H. J., Digges, T. G., Turning with shallow cuts at high speeds. J 3, 829 (1929) RP120.
French, H. J., Hamill, T. E., Hot aqueous solutions for the quenching of steels. J 3, 399 (1929) RP103.
French, H. J., Johnson, W. G., Effect of heat-treatment on the mechanical properties of one per cent carbon steel. T 16, 93 (1921-22) T206.
French, H. J., Kahlbaum, W., Peterson, A. A., Flow characteristics of special Fe-Ni-Cr alloys and some steels at elevated temperatures. J 5, 125 (1930) RP192.
French, H. J., Klopsch, O. Z.: Initial temperature and mass effects in quenching. T 19, 589 (1924-25) T295.
Some characteristics of quenching curves. T 20, 365 (1925-26) T313.
French, H. J., Rosenberg, S. J., Harbaugh, W. LeC., Cross, H. C., Wear and mechanical properties of railroad bearing bronzes at different temperatures. J 1, 343 (1928) RP13.
French, H. J., Staples, E. M., Bearing bronzes with and without zinc. J 2, 1017 (1929) RP68.
French, H. J., Strauss, J., Lathe breakdown tests of some modern high-speed tool steels. T 17, 183 (1922-24) T228.

French, H. J., Tucker, W. A., Flow in a low-carbon steel at various temperatures. T 19, 619 (1924-25) T296.

Fritz, W. C., Harris, M., Neville, H. A., Iodine number of wool: A method for determining the action of various chemical reagents on wool and other proteins. J 12, 803 (1934) RP689.

Frush, H. L., Brauns, D. H., Application of the fluorating process to fructose. J 6, 449 (1931) RP287.

Frush, H. L., Isbell, H. S.:
The oxidation of sugars. I. The electrolytic oxidation of aldose sugars in the presence of a bromide and calcium carbonate. J 6, 1145 (1931) RP328.

Preparation and properties of aldonic acids and their lactones and basic calcium salts. J 11, 649 (1933) RP613.

Electrolytic oxidation of xylose in the presence of alkaline earth bromides and carbonates. J 14, 359 (1935) RP773.

Alpha and beta methyl lyxosides, mannosides, gulosides, and heptosides of like configuration. J 24, 125 (1940) RP1274.

Sugar acetates, acetylglycosyl halides, and orthoacetates in relation to the Walden inversion. J 27, 413 (1941) RP1429.

Ring structures and mutarotations of the modifications of D-galacturonic acid. J 31, 33 (1943) RP1547.

Calcium chloride compounds of D- α -glucoheptose (D-glycero-D-gulo-aldoheptose). J 31, 163 (1943) RP1555.

Salts of galacturonic acid and their application to the preparation of galacturonic acid from pectic substances. J 32, 77 (1944) RP1576.

Preparation of salts of galacturonic acid from beet pulp. J 33, 389 (1944) RP1616.

Preparation of sodium strontium galacturonate from citrus products. J 33, 401, (1944) RP1617.

Acetyl derivatives of certain heptoses, of gulose, and of lactulose. J 35, 111 (1945) RP1663.

Mutarotation and ring structure of mannuronic lactone. J 37, 43 (1946) RP1727.

Preparation of mannuronic lactone from algin. J 37, 321 (1946) RP1750.

Frush, H. L., Isbell, H. S., Bates, F. J., Manufacture of calcium gluconate by the electrolytic oxidation of dextrose. J 8, 571 (1932) RP436.

Frush, H. L., Isbell, H. S., Pigman, W. W., Reducing powers of various sugars with alkaline copper-citrate reagent. J 24, 241 (1940) RP1282.

Fugitt, C. H., Sookne, A. M., Steinhardt, J., Electrolytic estimation of ash and of acidic and basic groups in textile fibers. J 25, 61 (1940) RP1314.

Fugitt, C. H., Steinhardt, J., Catalyzed hydrolysis of amide and peptide bonds in proteins. J 29, 315 (1942) RP1503.

Fugitt, C. H., Steinhardt, J., Harris, M.:
Combination of wool protein with acid and base: The effect of temperature on the titration curve. J 25, 519 (1940) RP1343.

Relative affinities of the anions of strong acids for wool protein. J 26, 293 (1941) RP1377.

Further investigations of the affinities of anions of strong acids for wool proteins. J 28, 201 (1942) RP1453.

Combination of wool protein with acids in mixtures, and its relation to the acid dyeing of wool. J 29, 417 (1942) RP1510.

Fullmer, I. H.:
Comparison of American, British, and German standards for machined fits. T 21, 401 (1926-27) T344.

Chart for determining the helix angles of screw threads. M109 (1930).

Fullmer, I. H., Miller, D. R., Standard thicknesses, weights and tolerances of sheet metal (customary practice). C391 (1931).

Fulton, H. R., Coblentz, W. W., A radiometric investigation of the germicidal action of ultra-violet radiation. S 19, 641 (1923-24) S495.

Fulweiler, W. H., Stang, A. H., Sweetman, L. R., Inspection and tensile tests of some worn wire ropes. J 17, 401 (1936) RP920.

Furlong, I., Williams, G. M., Durability of cement drain tile and concrete in alkali soils; fourth progress report, 1923. T 20, 191 (1925-26) T307.

G

Gagliardi, D., Rowen, J. W., Properties of water-repellent fabrics. J 38, 103, (1947) RP1762.

Gagon, D. H., Rosenberg, S. J., Effect of grain size and heat treatment upon impact-toughness at low temperatures of medium forging steel. J 27, 159 (1941) RP1410.

Gallup, B. E., Snoko, H. R., Accelerated weathering tests of mineral-surfaced asphalt shingles. J 18, 669 (1937) RP1002.

Gardner, F. G., Diamond, H., Engine-ignition shielding for radio reception in aircraft. J 4, 415 (1930) RP158.

Gardner, H. B., Krynlitsky, A. I., Saeger, Jr., C. M., Properties of cast red brass as affected by the ambient atmosphere during melting. J 31, 125 (1943) RP1553.

Gardner, H. B., Saeger, Jr., C. M., Effects of aluminum and of antimony on certain properties of cast red brass. J 22, 707 (1939) RP1215.

Gardner, J. C.:
Application of the algebraic aberration equations to optical design. S 22, 73 (1927-28) S550.

The optical requirements of airplane mapping. J 8, 445 (1932) RP427.

An attachment for turning approximately spherical surfaces of small curvature on a lathe. J 9, 227 (1932) RP467.

"Camera finish" at the race track. J 18, 467 (1937) RP986.

Relation of camera error to photogrammetric mapping. J 22, 209 (1939) RP1177.

Compensation of the aperture ratio markings of a photographic lens for absorption, reflection, and vignetting losses. J 38, 643 (1947) RP1803.

A test of lens resolution for the photographer. C428 (1940).

Charts for testing lens resolution. M166 (1940).

Gardner, J. C., Case, F. A.:
An optical coincidence gage. J 6, 229 (1931) RP272.

The lateral chromatic aberration of apochromatic microscope systems. J 6, 937 (1931) RP316.

Precision camera for testing lenses. J 18, 449 (1937) RP984.

The making of mirrors by the deposition of metal on glass. C 389 (1931).

Gates, E. R., Wig, R. J., Williams, G. M., Strength and other properties of concretes as affected by materials and methods of preparation. T 6, (1915-16) T58.

Gause, G. R., A study for the preparation of a specification for high-early-strength portland cement. J 15, 421 (1935) RP839.

Gause, G. R., Tucker, Jr., J., Method for determining the moisture condition in hardened concrete. J 25, 403 (1940) RP1334.

Geib, M. N. V., Bowker, R. C., Comparative durability of chrome and vegetable tanned sole leathers. T 19, 267 (1924-25) T286.

Geib, M. N. V., Schreiber, W. T., Moore, O. C.:
Consistency of potato-starch size. J 11, 765 (1933) RP623.

Effect of sizing, weaving, and abrasion on the physical properties of cotton yarn. J 18, 559 (1937) RP993.

Geib, M. N. V., Weber, C. G.:
Treatment of offset papers for optimum register. J 16, 93 (1936) RP859.

New test for dimensional changes in offset papers. J 19, 665 (1937) RP1054.

Geib, M. N. V., Weber, C. G., Shaw, M. B., O'Leary, M. J., An experimental study of beater practice in the manufacture of offset papers. J 28, 241 (1942) RP1455.

Geiger, W. B., Scale substance of wool. J 32, 127 (1944) RP1579.

Geiger, W. B., Harris, M., Dependence of the indigestibility of wool protein upon its polymeric structure. J 29, 271 (1942) RP1500.

Geiger, W. B., Kobayashi, F. F., Harris, M., Chemically modified wools of enhanced stability. J 29, 381 (1942) RP1506.

Geiger, W. B., Patterson, W. I., Mizell, L. R., Harris, M.:
Role of cystine in the structure of the fibrous protein, wool. J 27, 89 (1941) RP1405.

Nature of the resistance of wool to digestion by enzymes. J 27, 459 (1941) RP1433.

- Geil, G. W., McAdam, Jr., D. J.: Rate of oxidation of steels as determined from interference colors of oxide films. *J* 23, 63 (1939) RP1221.
- Influence of cyclic stress on corrosion pitting of steels in fresh water, and influence of stress corrosion on fatigue limit. *J* 24, 685 (1940) RP1307.
- Influence of stress on the corrosion pitting of aluminum bronze and monel metal in water. *J* 26, 135 (1941) RP1366.
- Rate of oxidation of typical nonferrous metals as determined by interference colors of oxide films. *J* 28, 593 (1942) RP1470.
- Geller, R. F.: Testing of fire-clay brick with special reference to their use in coal-fired boiler settings. *T* 19, 97 (1924-25) T279.
- A resistor furnace, with some preliminary results up to 2,000°C. *J* 27, 555 (1941) RP1443.
- Geller, R. F., Bunting, E. N.: The system $K_2O-PbO-SiO_2$. *J* 17, 277 (1936) RP911.
- The system $PbO-B_2O_3$. *J* 18, 585 (1937) RP995.
- The system $PbO-B_2O_3-SiO_2$. *J* 23, 275 (1939) RP1231.
- Length changes of whiteware clays and bodies during initial heating, with supplementary data on mica. *J* 25, 15 (1940) RP1311.
- Report on the systems lead oxide-alumina and lead oxide-alumina-silica. *J* 31, 255 (1943) RP1564.
- Geller, R. F., Creamer, A. S., Bunting, E. N.: The system: $PbO-SiO_2$. *J* 13, 237 (1934) RP705.
- Some "soft" glazes of low thermal expansion. *J* 20, 57 (1938) RP1064.
- Geller, R. F., Creamer, A. S., "Moisture expansion" of ceramic whiteware. *J* 9, 291 (1932) RP472.
- Solubility of colored glazes in organic acids. *J* 22, 441 (1939) RP1196.
- Some factors affecting the properties of ceramic talcose white-ware. *J* 26, 213 (1941) RP1371.
- Geller, R. F., Evans, D. N., A study of some ceramic bodies of low absorption maturing at temperatures below 1,000°C. *J* 9, 473 (1932) RP483.
- Geller, R. F., Evans, D. N., Creamer, A. S., Effects of particle size of a potter's "flint" and a feldspar in whiteware. *J* 11, 327 (1933) RP594.
- Geller, R. F., Ewell, R. H., Bunting, E. N., Thermal decomposition of talc. *J* 15, 551 (1935) RP848.
- Geller, R. F., Insley, H., Thermal expansion of some silicates of elements in Group II of the periodic system. *J* 9, 35 (1932) RP456.
- Geller, R. F., Yavorsky, P. J.: Melting point of alpha-alumina. *J* 34, 395 (1945) RP1649.
- Effects of some oxide additions on the thermal length changes of zirconia. *J* 35, 87 (1945) RP1662.
- Geller, R. F., Yavorsky, P. J., Steierman, B. L., Creamer, A. S., Studies of binary and ternary combinations of magnesia, calcia, baria, beryllia, alumina, thoria, and zirconia in relation to their use as porcelains. *J* 36, 277 (1946) RP1703.
- George, E. B., Dickinson, H. C., Mueller, E. F., Specific heat of some calcium chloride solutions between -35°C and +20°C. *B* 6, 379 (1909-10). S135.
- George, W. D., Production of accurate one-second time intervals. *J* 21, 367 (1938) RP1136.
- George, W. D., Selby, M. C., Scolnik, R., Electrical characteristics of quartz-crystal units and their measurement. *J* 38, 309 (1947) RP1774.
- Gero, W. B., Hidnert, P., Thermal expansion, of molybdenum. *S* 19, 429 (1923-24) S488.
- Gibson, K. S.: Photoelectric spectrophotometry by the null method. *S* 15, 325 (1919-20) S349.
- A filter for obtaining light at wave length 560 millimicrons. *J* 14, 545 (1935) RP785.
- Gibson, K. S., Balcom, M. M., Transmission measurements with the Beckman quartz spectrophotometer. *J* 38, 601 (1947) RP1798.
- Gibson, K. S., Davis, R.: The relative spectral energy distribution and correlated color temperature of the N. P. L. white-light standard. *J* 7, 791 (1931) RP374.
- Filters for producing the color of the equal-energy stimulus. *J* 12, 263 (1934) RP652.
- Filters for the reproduction of sunlight and daylight and the determination of color temperature. M114 (1931).
- Gibson, K. S., Harris, F. K., Priest, I. G., Lovibond color system. I. A spectrophotometric analysis of the Lovibond glasses. *S* 22, 1 (1927-28) S547.
- Gibson, K. S., Haupt, G. W.: Standardization of Lovibond red glasses in combination with Lovibond 35 yellow. *J* 13, 433 (1934) RP718.
- Standardization of the luminous-transmission scale used in the specification of railroad signal glasses. *J* 22, 627 (1939) RP1209.
- Gibson, K. S., Haupt, G. W., Keegan, H. J., Specification of railroad signal colors and glasses. *J* 36, 1 (1946) RP1688.
- Gibson, K. S., Judd, D. B., Note on the effect of a cover glass in reflectance measurements. *J* 16, 261 (1936) RP872.
- Gibson, K. S., Kelly, K. L., Nickerson, D., Tristimulus specification of the Munsell book of color from spectrophotometric measurements. *J* 31, 55 (1943) RP1549.
- Gibson, K. S., McNicholas, H. J., The ultra-violet and visible transmission of eye-protective glasses. *T* 11, (1918-19) T119.
- Gibson, K. S., McNicholas, H. J., Tyndall, E. P. T., Frehafer, M. K., Mathewson, W. E., The spectral transmissive properties of dyes: I. Seven permitted food dyes, in the visible, ultra-violet, and near infra-red. *S* 18, 185 (1922-23) S440.
- Gibson, K. S., Priest, I. G., Judd, D. B., Walker, G. K., Calibration of sixty-five 35-yellow Lovibond glasses. *J* 2, 793 (1929) RP58.
- Gibson, K. S., Priest, I. G., McNicholas, H. J., An examination of the Munsell color system. I. Spectral and total reflection and the Munsell scale of value. *T* 13, (1919-20) T167.
- Gibson, K. S., Priest, I. G., Meggers, W. F., Tyndall, E. P. T., McNicholas, H. J., The color and spectral composition of certain high-intensity searchlight arcs. *T* 13, (1919-20) T168.
- Gibson, K. S., Tyndall, E. P. T., The visibility of radiant energy. *S* 19, 131 (1923-24) S475.
- Gibson, K. S., Tyndall, E. P. T., McNicholas, H. J., The ultra-violet and visible transmission of various colored glasses. *T* 13, (1919-20) T148.
- Gibson, R. E., Wood, L. A., Bekkedahl, N., Effect of pressure on the melting of crystalline rubber. *J* 35, 375 (1945) RP1677.
- Gilchrist, R.: Investigations on the platinum metals. IV. Determination of iridium in platinum alloys by the method of fusion with lead. *S* 19, 325 (1923-24) S483.
- A gravimetric method for the determination of ruthenium. *J* 3, 993 (1929) RP125.
- A method for the separation and gravimetric determination of osmium. *J* 6, 421 (1931) RP286.
- A new determination of the atomic weight of osmium. *J* 9, 279 (1932) RP471.
- A method for the separation of rhodium from iridium and the gravimetric determination of these metals. *J* 9, 547 (1932) RP489.
- A method for the separation of ruthenium from platinum, palladium, rhodium, and iridium. *J* 12, 283 (1934) RP654.
- Methods for the separation of platinum, palladium, rhodium, and iridium from one another and for their gravimetric determination. *J* 12, 291 (1934) RP655.
- New procedure for the analysis of dental gold alloys. *J* 20, 745 (1938) RP1103.
- Analytical separations by means of controlled hydrolytic precipitation. *J* 30, 89 (1943) RP1519.
- Gillett, H. W., High silicon structural steel. *T* 21, 121 (1926-27) T331.
- Gilliland, T. R.: Kennelly-Heavyside layer height observations for 4,045 and 8,650 kc. *J* 5, 1057 (1930) RP246.
- Continuous measurements of the virtual heights of the ionosphere. *J* 11, 141 (1933) RP582.
- Note on a multifrequency automatic recorder of ionosphere heights. *J* 11, 561 (1933) RP608.
- Multifrequency ionosphere recording and its significance. *J* 14, 283 (1935) RP769.

- Gilliland, T. R., Kenrick, G. W., Preliminary note on an automatic recorder giving a continuous height record of the Kennelly-Heavyside layer. J 7, 783 (1931) RP373.
- Gilliland, T. R., Kenrick, G. W., Norton, K. A., Investigations of Kennelly-Heavyside layer heights for frequencies between 1,600 and 8,650 kilocycles per second. J 7, 1083 (1931) RP390.
- Gilliland, T. R., Kirby, S. S., Berkner, L. V., Norton, K. A., Radio observations of the Bureau of Standards during the solar eclipse of August 31, 1932. J 11, 829 (1933) RP629.
- Gilliland, T. R., Kirby, S. S., Judson, E. B., Ionosphere studies during partial solar eclipse of February 3, 1935. J 16, 213 (1936) RP868.
- Gilliland, T. R., Kirby, S. S., Smith, N., Reymers, S. E.: Characteristics of the ionosphere and their application to radio transmission. J 18, 645 (1937) RP1001.
- Maximum usable frequencies for radio sky-wave transmission, 1933 to 1937. J 20, 627 (1938) RP1096.
- Gilliland, T. R., Parkinson, T., A radio method for synchronizing recording apparatus. J 6, 195 (1931) RP269.
- Gilliland, T. R., Smith, N., Kirby, S. S.: Trends of characteristics of the ionosphere for half a sunspot cycle. J 21, 835 (1938) RP1159.
- Application of graphs of maximum usable frequency to communication problems. J 22, 81 (1939) RP1167.
- Gilliland, T. R., Taylor, A. S., Field equipment for ionosphere measurements. J 26, 377 (1941) RP1384.
- Gillis, C. L., Jackson, R. F., The double-polarization method for estimation of sucrose and the evaluation of the Clerget divisor. S 16, 125 (1920) S375.
- Gilmont, R., Prosen, E. J., Rossini, F. D., Heats of combustion of benzene, toluene, ethylbenzene, o-xylene, m-xylene, p-xylene, n-propylbenzene, and styrene. J 34, 65 (1945) RP1629.
- Ginnings, D. C., Corruccini, R. J.: An improved ice calorimeter — the determination of its calibration factor and the density of ice at 0° C. J 38, 583 (1947) RP1796.
- Enthalpy, specific heat, and entropy of aluminum oxide from 0° to 900° C. J 33, 593 (1947) RP1797.
- Ginnings, D. C., Fiock, E. F., Heat of vaporization of water at 50°, 70°, and 90° C. J 8, 321 (1932) RP416.
- Ginnings, D. C., Fiock, E. F., Holton, W. B., Calorimetric determinations of thermal properties of methyl alcohol, ethyl alcohol, and benzene. J 6, 881 (1931) RP312.
- Ginnings, D. C., Osborne, N. S., Stimson, H. F.: Calorimetric determination of the thermodynamic properties of saturated water in both the liquid and gaseous states from 100° to 374° C. J 18, 389 (1937) RP983.
- Measurements of heat capacity and heat of vaporization of water in the range 0° to 100° C. J 23, 197 (1939) RP1228.
- Thermal properties of saturated water and steam. J 23, 261 (1939) RP1229.
- Ginnings, D. C., Osborne, N. S., Stimson, H. F., Fiock, E. F., The pressure of saturated water vapor in the range 100° to 374° C. J 10, 155 (1933) RP523.
- Glading, F. W., Rosa, E. B., Brooks, H. P., McCollum, B., Canada, W. J., Investigation of cartridge-inclosed fuses. T 8, (1916-17) T74.
- Glasgow, Jr., A. R., Isolation of 3-methylhexane, trans-1,2-dimethylcyclopentane, and trans-1,3-dimethylcyclopentane from petroleum. J 24, 509 (1940) RP1296.
- Glasgow, Jr., A. R., Forziati, A. F., Willingham, C. B., Rossini, F. D., Purification and properties of 29 paraffin, 4 alkylcyclopentane, 10 alkylcyclohexane, and 8 alkylbenzene hydrocarbons. J 36, 129 (1946) RP1695.
- Glasgow, Jr., A. R., Mair, B. J., Rossini, F. D.: Determination of freezing points and amounts of impurity in hydrocarbons from freezing and melting curves. J 26, 591 (1941) RP1397.
- Separation of hydrocarbons by azeotropic distillation. J 27, 39, (1941) RP1402.
- Glasgow, Jr., A. R., Murphy, E. T., Willingham, C. R., Rossini, F. D., Purification, purity, and freezing points of 31 hydrocarbons of the American Petroleum Institute—National Bureau of Standards series. J 37, 141 (1946) RP1734.
- Glasgow, Jr., A. R., Rossini, F. D., Reflux regulator and head for laboratory rectifying columns. J 23, 509 (1939) RP1249.
- Glasgow, Jr., A. R., Schickel, S. T., Study of ball packings for laboratory rectifying columns. J 19, 593 (1937) RP1049.
- Glasgow, Jr., A. R., Streiff, A. J., Rossini, F. D., Determination of the purity of hydrocarbons by measurement of freezing points. J 35, 355 (1945) RP1676.
- Glasgow, Jr., A. R., Streiff, A. J., Willingham, C. B., Rossini, F. D., Analyses of alkylates and hydrocodimers. J 38, 537 (1947) RP1795.
- Glasgow, Jr., A. R., White, J. D.: Separation of the three methyloctanes from midcontinent petroleum. J 19, 423 (1937) RP1033.
- Separation of 1, 2, 4-trimethylcyclohexane and an isononane from a midcontinent petroleum. J 22, 137 (1939) RP1173.
- Glasgow, Jr., A. R., Willingham, C. B., Rossini, F. D., Hydrocarbons in the 102° to 108° C fraction of petroleum. J 38, 621 (1947) RP1800.
- Glaze, F. W., Finn, A. N.: Routine determination of boron in glass. J 16, 421 (1936) RP882.
- An improvement in the "partition method" for the determination of boron. J 27, 33 (1941) RP1401.
- Glaze, F. W., Inasley, H., Some optical and crystallographical properties of the alkali zinc uranyl acetates. J 12, 471 (1934) RP672.
- Glaze, F. W., Young, J. C., Faick, C. A., Finn, A. N., Density of some soda-potash-silica glasses as a function of the composition. J 22, 453 (1939) RP1197.
- Glaze, F. W., Young, J. C., Finn, A. N., The density of some soda-lime-silica glasses as a function of the composition. J 9, 799 (1932) RP507.
- Gleysteen, L. F., Deitz, V. R.: Determination of carbon and hydrogen in bone black and other chars. J 28, 795 (1942) RP1479.
- Surface available to nitrogen on bone black and other carbonaceous adsorbents. J 29, 191 (1942) RP1496.
- Hysteresis in the physical adsorption of nitrogen on bone char and other adsorbents. J 35, 285 (1945) RP1674.
- Gleysteen, L. F., Harris, M., Combination of silk fibroin with acid and with base. J 26, 71 (1941) RP1360.
- Gleysteen, L. F., Mease, R. T., Fluidity of Triton F and xanthate solutions as a measure of cellulose degradation. J 27, 543 (1941) RP1441.
- Godfrey, T. B., Further data on gold-chromium resistance wire. J 22, 565 (1939) RP1206.
- Goergen, S. M., Jackson, R. F.: A crystalline difructose anhydride from hydrolyzed inulin. J 3, 27 (1929) RP79.
- Note on the individualities of anhydrofructose and difructose anhydride. J 5, 733 (1930) RP224.
- Goerke, V. H., Brombacher, W. G., Cordero, F., Sensitive aneroid diaphragm capsule with no deflection above a selected pressure. J 24, 31 (1940) RP1270.
- Goldbeck, A. T., Slater, W. A., Pouring and pressure tests of concrete. T 14, (1920-21) T175.
- Golden, G. E., Hunter, R. B., Back-flow prevention in over-rim water supplies. BMS28 (1939).
- Golden, G. E., Hunter, R. B., Eaton, H. N., Cross-connections in plumbing systems. J 20, 479 (1938) RP1086.
- Goldman, M. H., Hubbard, C. C., Cleaning of fur and leather garments. T 22, 183 (1927-28) T360.
- Goldman, M. H., Hubbard, C. C., Schoffstall, C. W., Effect of dry cleaning on silks. A comparison of the effect of dry cleaning and some service conditions on the strength of silk. T 20, 605 (1925-26) T322.
- Gonyo, B. L., Epstein, S. W., Extraction of rubber goods. T 13, (1919-20) T162.
- Gordon, C. L., Modification of the Carius combustion tube to minimize losses by explosion: Pressures attained on heating nitric acid to 300° C. J 30, 107 (1943) RP1521.

- Gordon, C. L., Schlecht, W. G., Wichers, E.: Attack of refractory platiniferous materials by acid mixtures at elevated temperatures. *J 33*, 363 (1944) RP1614.
- Preparing refractory oxides, silicates, and ceramic materials for analysis by heating with acids in sealed tubes at elevated temperatures. *J 33*, 451, (1944) RP1621.
- Use of sealed tubes for the preparation of acid solutions of samples for analysis, or for small scale refining: Pressures of acids heated above 100° C. *J 33*, 457, (1944) RP1622.
- Gordon, E. D., Briggs, C. A.: Method for precision test of large capacity scales. *T 15*, (1921) T199.
- Weighing by substitution. *T 16*, 177 (1921-22) T208.
- Gottschalk, V. H., Hamill, G. K., Bicking, G. W.: Use of glue in coated paper. *T 20*, 635 (1925-26) T233.
- Gough, C., Stang, A. H., Sweetman, L. R., The areas and tensile properties of deformed concrete-reinforcement bars. *J 9*, 509 (1932) RP486.
- Gould, R. E.: Comparative performance of watches with elinvar and with steel hair springs. *J 12*, 451 (1934) RP670.
- Testing of timepieces. C392 (1931).
- Standard time throughout the world. C399 (1932).
- Sundials. C402 (1933).
- Standard time throughout the world. C406 (1935).
- Testing of timepieces. C432 (1941).
- Standard time conversion chart. M84 (2d ed.), (1931).
- Standard time zones of the United States and adjacent parts of Canada and Mexico. M111 (1930).
- Standard time zones of the United States and adjacent parts of Canada and Mexico. M155 (1935).
- Gowens, G. J., Roeser, W. F., Dahl, A. I., Standard tables for chromel-alumel thermocouples. *J 14*, 239 (1935) RP767.
- Gracely, F. R., Coblenz, W. W., Stair, R., Measurements of ultraviolet solar- and sky-radiation intensities in high latitudes. *J 28*, 581 (1942) RP1469.
- Grant, V. H., Peters, M. F., Determination of optimum voltage for airplane electric systems. *J 23*, 485 (1939) RP1247.
- Gray, A. W.: Micrometer microscopes. *B 10*, 375 (1914) S215.
- Production of temperature uniformity in an electric furnace. *B 10*, 451 (1914) S219.
- Protected thermoelements. *B 13*, 283 (1916-17) S276.
- Green, C. B., Jessup, R. S., Heat of combustion of standard sample benzoic acid. *J 13*, 469 (1934) RP721.
- Greene, K. T., Dicalcium silicate solid solutions. *J 32*, 1 (1944) RP1570.
- Greene, K. T., Bogue, R. H., Phase equilibrium relations in a portion of the system Na₂O-CaO-Al₂O₃-SiO₂. *J 36*, 185 (1946) RP1699.
- Greene, T. W., Strength of steel tubing under combined column and transverse loading, including tests of columns and beams. *T 18*, 243 (1924-25) T258.
- Greene, T. W., Stang, A. H., Stresses in a few welded and riveted tanks tested under hydrostatic pressure. *T 17*, 645 (1922-24) T243.
- Greenspan, M.: Approximation to a function of one variable from a set of its mean values. *J 23*, 309 (1939) RP1235.
- Axial rigidity of perforated structural members. *J 31*, 305 (1943) RP1568.
- Theory for axial rigidity of structural members having ovaloid or square perforations. *J 37*, 157 (1945) RP1737.
- Greenspan, M., Stang, A. H.: Graphical computation of stresses from strain data. *J 19*, 437 (1937) RP1034.
- Strength of a welded steel rigid frame. *J 23*, 145 (1939) RP1224.
- Perforated cover plates for steel columns: Program and test methods. *J 28*, 669 (1942) RP1473.
- Perforated cover plates for steel columns: Compressive properties of plates having ovaloid perforations and a width-to-thickness ratio of 40. *J 28*, 687 (1942) RP1474.
- Perforated cover plates for steel columns: Compressive properties of plates having ovaloid perforations and a width-to-thickness ratio of 68. *J 29*, 279 (1942) RP1501.
- Perforated cover plates for steel columns: Compressive properties of plates having ovaloid perforations and a width-to-thickness ratio of 53. *J 30*, 15 (1943) RP1514.
- Perforated cover plates for steel columns: Compressive properties of plates having circular perforations and a width-to-thickness ratio of 53. *J 30*, 177 (1943) RP1527.
- Perforated cover for steel columns: Compressive properties of plates having a net-to-gross cross-sectional-area ratio of 0.33. *J 30*, 411 (1943) RP1540.
- Greenspan, M., Stang, A. H., Newman, S. B.: Dynamic tensile tests of parachute webbing. *J 36*, 411 (1946) RP1710.
- Poisson's ratio of some structural alloys for large strains. *J 37*, 211 (1946) RP1742.
- Greenspan, M., Stang, A. H., Osgood, W. R.: Strength of a riveted steel rigid frame having straight flanges. *J 21*, 269 (1938) RP1130.
- Strength of a riveted steel rigid frame having a curved inner flange. *J 21*, 853 (1938) RP1161.
- Greenspan, M., Sweetman, L. R., A transfer strain gage for large strains. *J 34*, 595 (1945) RP1658.
- Grenell, L. H., Jordan, L., Herschman, H. K., Tarnish resisting silver alloys. *T 21*, 459 (1926-27) T348.
- Gries, J. M., Curran, T. M., Present home financing methods. BH12 (1928).
- Gries, J. M., Taylor, J. S.: How to own your home: A handbook for prospective home owners. BH4 (1923).
- How to own your home. BH17 (1931).
- Griffin, H. K., Ingberg, S. H., Robinson, W. C., Wilson, R. E., Fire tests of building columns. *T 15*, (1921) T184.
- Griffith, J. H., Bragg, J. G.: Tests of large bridge columns. *T 10*, (1917-18) T101.
- Strength and other properties of wire rope. *T 12*, (1919) T121.
- Grodsky, V. A., Logan, K. H., Soil-corrosion studies, 1930. Rates of corrosion and pitting of bare ferrous specimens. *J 7*, 1 (1931) RP329.
- Groesbeck, E. C.: Metallographic etching reagents, III; for alloy steels. *S 20*, 527 (1924-26) S518.
- Influence of phosphorus upon the microstructure and hardness of low-carbon, open-hearth steels. *T 16*, 1 (1921-22) T203.
- Groesbeck, E. C., Epstein, S., Cross, H. C., Wymore, I. J., Observations on the iron-nitrogen system. *J 3*, 1005 (1929) RP126.
- Groesbeck, E. C., Howe, H. M., Stresses caused by cold-rolling. *T 13*, (1919-20) T163.
- Groesbeck, E. C., Rawdon, H. S., Effect of the testing method on the determination of corrosion resistance. *T 22*, 409 (1927-28) T367.
- Groesbeck, E. C., Rawdon, H. S., Jordan, L., Electric-arc welding of steel: I. properties of the arc-fused metal. *T 14*, (1920-21) T179.
- Groesbeck, E. C., Tucker, W. A., Accelerated laboratory corrosion test methods for zinc-coated steel. *J 1*, 255 (1928) RP10.
- Groesbeck, E. C., Walkup, H. H., Preece test (copper-sulphate dip) for zinc coatings. *J 12*, 785 (1934) RP688.
- Groesbeck, E. C., Wilson, J. H., Tests of corrosion inhibitors for water treatment in air-conditioning equipment. *J 24*, 665 (1940) RP1305.
- Gross, F. J., Silsbee, F. B., Testing and performance of volt boxes. *J 27*, 269 (1941) RP1419.
- Gross, S. T., Clark, G. L., Smith, W. H.: X-ray diffraction patterns of crystalline sol rubber prepared from ethereal solution. *J 22*, 105 (1939) RP1170.
- X-ray diffraction patterns of Hevea, Manihot, and other rubbers. *J 23*, 1 (1939) RP1218.
- Grover, F. W.: The simultaneous measurement of the capacity and power factor of condensers. *B 3*, 371 (1907) S64.

- The mutual inductances of two parallel coaxial circles in terms of hypergeometrical series. B 6, 489 (1909-10) S138.
- The capacity and phase difference of paraffined paper condensers as functions of temperature and frequency. B 7, 495 (1911) S166.
- Analysis of alternating-current waves by the method of Fourier, with special reference to methods of facilitating the computations. B 9, 567 (1913) S203.
- Calculation of the maximum force between two coaxial circular currents. B 12, 317 (1915-16) S255.
- Additions to the formulas for the calculation of mutual and self inductance. B 14, 537 (1918-19) S320.
- Tables for the calculation of the inductance of circular coils of rectangular cross sections. S 18, 451 (1922-23) S455.
- Formulas and tables for the calculation of the inductance of coils of polygonal form. S 18, 737 (1922-23) S468.
- Tables for the calculation of the mutual inductance of circuits with circular symmetry about a common axis. S 20, 1 (1924-26) S498.
- Methods, formulas, and tables for the calculation of antenna capacity. S 22, 569 (1927-28) S568.
- Methods for the derivation and expansion of formulas for the mutual inductance of coaxial circles and for the inductance of single-layer solenoids. J 1, 487 (1928) RP16.
- A comparison of the formulas for the calculation of the inductance of coils and spirals wound with wire of large cross section. J 3, 163 (1929) RP90.
- Grover, F. W., Curtis, H. L.:**
The measurement of the inductances of the resistance coils. B 8, 455 (1912) S175.
Resistance coils for alternating current work. B 8, 495 (1912) S177.
- Grover, F. W., Rosa, E. B.:**
The absolute measurement of inductance. B 1, 125 (1903-05) S9.
The absolute measurement of capacity. B 1, 153 (1903-05) S10.
Measurement of inductance by Anderson's method, using alternating currents and a vibration galvanometer. B 1, 291 (1903-05) S14.
Use of serpentine in standards of inductance. B 1, 337 (1903-05) S15.
Formulas and tables for the calculation of mutual and self-inductance. (Third edition, revised and enlarged). B 8, 1 (1912) S169.
- Grunwell, P. C.,** Studies of machines for extruding clay columns. Augers, spacers, and dies for brick machines. J 1, 1023 (1928) RP36.
- Gurevich, L. J., Merica, P. D.,** Notes on the graphitization of white cast iron upon annealing. T 12, (1919) T129.
- Gurewitz, H. L., Tilton, L. W.,** Measurement of the refractive index and dispersion of optical glass for control of product. J 32, 39 (1944) RP1572.
- Guthe, K. E.:**
A study of the silver voltameter. B 1, 21 (1903-05) S2.
On fibers resembling fused quartz in their elastic properties. B 1, 101 (1903-05) S7.
The silver coulometer. B 1, 349 (1903-05) S16.
A new determination of the electromotive force of Weston and Clark standard cells by an absolute electrodynamic method. B 2, 33 (1906) S27.
- Guthe, K. E., Austin, L. W.,** Experiments on the Heusler magnetic alloys. B 2, 297 (1906) S38.
- ## H
- Hagener, A., Slater, W. A., Anthes, G. P.,** Test of a hollow tile and concrete floor slab reinforced in two directions. T 16, 727 (1921-22) T220.
- Hague, J. L., Bright, H. A.:**
Determination of boron in steel and cast iron. J 21, 125 (1938) RP1120.
Colorimetric determination of phosphorus in steel and cast iron. J 26, 405 (1941) RP1386.
- Hahner, C., Voigt, G. Q., Finn, A. N.,** Gases in some optical and other glasses. J 19, 95 (1937) RP1014.
- Hall, E. L.:**
Resistance of conductors of various types and sizes as windings of single-layer coils at 150 to 6,000 kilocycles. T 21, 109 (1926-27) T330.
Method and apparatus used in testing piezo oscillators for broadcasting stations. J 4, 115 (1930) RP135.
Accurate method of measuring transmitted wave frequencies at 5,000 and 20,000 kilocycles per second. J 5, 647 (1930) RP220.
- Hall, E. L., Heaton, V. E., Lapham, E. G.,** The national primary standard of radio frequency. J 14, 85 (1935) RP759.
- Hall, E. L., Lewis, A. B., Caldwell, F. R.,** Some electrical properties of foreign and domestic micas, and the effect of elevated temperatures on micas. J 7, 403 (1931) RP347.
- Hall, E. L., Preston, J. L.,** A study of the seasonal variation of radio-frequency phase difference of laminated phenolic insulating materials. T 19, 225 (1924-25) T284.
- Hall, F. P.,** Methods of measuring the plasticity of clays. T 17, 345 (1922-24) T234.
- Hall, J. V., Palmer, L. A.,** Durability and strength of bond between mortar and brick. J 6, 473 (1931) RP290.
- Hall, W. L., Slater, C. S., Acree, S. F.,** Preliminary investigations upon two cellulosic wastes as sources for xylose. J 4, 329 (1930) RP152.
- Ham, L. B., Hogaboom, G. B., Slatery, T. F.,** "Black nickel" plating solutions. T 15, (1921) T190.
- Hamer, W. J., Acree, S. F.:**
Effects of corrections for liquid-junction potentials of saturated calomel electrodes on dissociation constants obtained by electrometric titration. J 17, 605 (1936) RP930.
Potentiometric method for the accurate measurement of hydrogen-ion activity. J 23, 647 (1939) RP1261.
A method for the determination of the pH of 0.05-molal solutions of acid potassium phthalate with or without potassium chloride. J 32, 215 (1944) RP1586.
A comparison of platinum and palladium hydrogen electrodes in aqueous solutions of acid potassium phthalate. J 33, 87, (1944) RP1598.
Second dissociation constant of *o*-phthalic acid and related pH values of phthalate buffers from 0° to 60° C. J 35, 381 (1945) RP1678.
- Hamer, W. J., Bates, R. G., Manov, G. G., Acree, S. F.,** Provisional pH values for certain standard buffer solutions. J 29, 183 (1942) RP1495.
- Hamer, W. J., Burton, J. O., Acree, S. F.:**
Dissociation constants of malonic acid in its sodium-salt solutions at 25° C from electrometric titration measurements. J 16, 575 (1936) RP895.
Second ionization constant and related thermodynamic quantities for malonic acid from 0° to 60° C. J 24, 269 (1940) RP1284.
- Hamer, W. J., Pinching, G. D., Acree, S. F.:**
pH values of acid-salt mixtures of some aromatic sulfonic acids at various temperatures and a criterion of completeness of dissociation. J 31, 291 (1943) RP1567.
First dissociation constant of *o*-phthalic acid and related pH values of phthalate buffers from 0° to 60° C. J 35, 539 (1945) RP1687.
pH standards at various temperatures: aqueous solutions of acid potassium phthalate. J 36, 47 (1946) RP1690.
- Hamill, G. K., Gottschalk, V. H., Bicking, G. W.,** Use of glue in coated paper. T 20, 635 (1925-26) T323.
- Hamill, T. E.,** Aqueous solutions of ethylene glycol, glycerin, and sodium silicate as quenching media for steels. J 7, 555 (1931) RP357.
- Hamill, T. E., French, H. J.,** Hot aqueous solutions for the quenching of steels. J 3, 399 (1929) RP103.
- Hamilton, E. H., Hubbard, D.:**
Effect of the chemical durability of glass on the asymmetry potential and reversibility of the glass electrode. J 27, 27 (1941) RP1400.
Studies of the chemical durability of glass by an interferometer method. J 27, 143 (1941) RP1409.
Titration and conductivity measurements of aqueous extracts from bottles. J 27, 381 (1941) RP1426.

- Hamilton, E. H., Hubbard, D., Finn, A. N., Effect of the solubility of glass on the behavior of the glass electrode. *J* 22, 339 (1939) RP1187.
- Hamilton, E. H., Thompson, J. G., Nitrogen content of some standard-sample steels. *J* 9, 593 (1932) RP494.
- Hamlin, C. H., Worner, R. K., Properties of knit underwear fabrics of various constructions. *J* 13, 311 (1934) RP711.
- Hamm, H. A., Cleveland, R. S., Relation between the twist and certain properties of rayon yarns. *J* 7, 617 (1931) RP361.
- Hamm, H. A., Schoffstall, C. W., A multiple-strand test for yarns. *J* 2, 871 (1929) RP61.
- Hamm, H. A., Stevens, R. E., A method of measuring the stress-strain relations of wet textiles with application to wet rayons. *J* 3, 927 (1929) RP122.
- Hammond, L. D., Redetermination of the Munson-Walker reducing-sugar values. *J* 24, 579 (1940) RP1301.
- Hammond, L. D., Snyder, C. F.: Note on the determination of weight per gallon of blackstrap molasses. *T* 21, 409 (1926-27) T345.
- Weights per United States Gallon and weights per cubic foot of sugar solutions. C375 (1929).
- Hanna, N. P., Smith, W. H., Comparison between the observed density of crystalline rubber and the density calculated from X-ray data. *J* 27, 229 (1941) RP1416.
- Hannen, P. T., Peters, M. F., Blackburn, G. F.: Theory of voltage dividers and their use with cathode ray oscillographs. *J* 9, 81 (1932) RP460.
- Electrical character of the spark discharge of automotive ignition systems. *J* 19, 401 (1937) RP1032.
- Hansen, W. C., Influence of magnesia, ferric oxide, and soda upon the temperature of liquid formation in certain Portland cement mixtures. *J* 4, 55 (1930) RP132.
- Harbaugh, W. LeC., French, H. J., Rosenberg, S. J., Cross, H. C., Wear and mechanical properties of railroad bearing bronzes at different temperatures. *J* 1, 343 (1928) RP13.
- Haring, H. E., Barrows, W. P., Electrodeposition of chromium from chromic acid baths. *T* 21, 413 (1926-27) T346.
- Harper, 3d., D. R.: Thermometric lag. *B* 8, 659 (1912) S185.
- Specific heat of copper in the interval 0° to 50° C, with a note on vacuum-jacketed calorimeters. *B* 11, 259 (1915) S231.
- Harper, 3d., D. R., Cragoe, C. S., Specific volume of liquid ammonia. *S* 17, 287 (1922) S420.
- Harper, 3d., D. R., Dewey, P. H., Heats of combustion of anthracite cokes and of artificial and natural graphites. *J* 21, 457 (1938) RP1139.
- Harper, 3d., D. R., Dickinson, H. C., Osborne, N. S., Latent heat of fusion of ice. *B* 10, 235 (1914) S209.
- Harper, 3d., D. R., Parsons, S. R., Radiators for aircraft engines. *T* 16, 247 (1921-22) T211.
- Harper, 3d., D. R., Waidner, C. W., Dickinson, H. C., Mueller, E. F., A wheatstone bridge for resistance thermometry. *B* 11, 571 (1915) S241.
- Harris, A. L., Stang, A. H., McBurney, J. W., Compressive strength of steel columns incased in brick walls. *J* 10, 123 (1933) RP520.
- Harris, C. L., Influence of neighboring structures on the wind pressure on tall buildings. *J* 12, 103 (1934) RP637.
- Harris, F. K.: A suppressed-zero electrodynamic voltmeter. *J* 3, 445 (1929) RP105.
- A new cathode-ray oscillograph and its application to the study of power loss in dielectric materials. *J* 12, 87 (1934) RP636.
- Coil arrangements for producing a uniform magnetic field. *J* 13, 391 (1934) RP716.
- Harris, F. K., Cooter, I. L., Peters, C. G., Emerson, W. B., Nefflen, E., Electrical methods for diamond-die production. *J* 38, 449 (1947) RP1787.
- Harris, F. K., Gibson, K. S., Priest, I. G., Lovibond color system. I. A spectrophotometric analysis of the Lovibond glasses. *S* 22, 1 (1927-28) S547.
- Harris, F. K., Peters, C. G., Nefflen, K. F., Diamond cutting accelerated by an electric arc. *J* 34, 587 (1945) RP1657.
- Harris, M.: The isoelectric point of wool. *J* 8, 779 (1932) RP451.
- The isoelectric point of silk. *J* 9, 557 (1932) RP490.
- The combination of silk and wool with positive and negative ions. *J* 10, 475 (1933) RP543.
- The carbonization process: A study of the system wool — sulphuric-acid — water. *J* 12, 475 (1934) RP673.
- Photochemical decomposition of silk. *J* 13, 151 (1934) RP697.
- Effect of alkalis on wool. *J* 15, 63 (1935) RP810.
- Harris, M., Crowder, J. A., Mechanism of the sulfur lability in the alkali degradation of wool protein. *J* 16, 475 (1936) RP885.
- Harris, M., Geiger, W. B., Dependence of the indigestibility of wool protein upon its polymeric structure. *J* 29, 271 (1942) RP1500.
- Harris, M., Geiger, W. B., Kobayashi, F. F., Chemically modified wools of enhanced stability. *J* 29, 381 (1942) RP1506.
- Harris, M., Geiger, W. B., Patterson, W. I., Mizell, L. R., Nature of the resistance of wool to digestion by enzymes. *J* 27, 459 (1941) RP1433.
- Harris, M., Gleysteen, L. F., Combination of silk fibroin with acid and with base. *J* 26, 71 (1941) RP1360.
- Harris, M., Hock, C. W., Microscopic examination of cotton fibers in cuprammonium hydroxide solutions. *J* 24, 749 (1940) RP1309.
- Harris, M., Hock, C. W., Ramsay, R. C.: Microscopic structure of the cotton fiber. *J* 26, 93 (1941) RP1362.
- Microscopic structure of the wool fiber. *J* 27, 181 (1941) RP1412.
- Harris, M., Hock, C. W., Sookne, A. M., Thermal properties of moist fabrics. *J* 32, 229 (1944) RP1587.
- Harris, M., Jessup, D. A., The effect of pH on the photochemical decomposition of silk. *J* 7, 1179 (1931) RP395.
- Harris, M., Kanagy, J. R., Amino-nitrogen contents of wool and collagen. *J* 14, 563 (1935) RP787.
- Harris, M., Martin, A. R., Smith, L., Whistler, R. L., Estimation of aldehyde groups in hydrocellulose from cotton. *J* 27, 449 (1941) RP1432.
- Harris, M., Mease, R., Rutherford, H., Reaction of wool with strong solutions of sulfuric acid. *J* 18, 343 (1937) RP980.
- Harris, M., Mizell, L. R., Nature of the reaction of wool with alkali. *J* 30, 47 (1943) RP1516.
- Harris, M., Mizell, L. R., Fourt, L., Elasticity of wool as related to its chemical structure. *J* 29, 73 (1942) RP1486.
- Harris, M., Neville, H. A., Selective adsorption from soap solutions. *J* 14, 765 (1935) RP801.
- Harris, M., Neville, H. A., Fritz, W. C., Iodine number of wool: A method for determining the action of various chemical reagents on wool and other proteins. *J* 12, 803 (1934) RP689.
- Harris, M., Patterson, W. I., Geiger, W. B., Mizell, L. R., Role of cystine in the structure of the fibrous protein, wool. *J* 27, 89 (1941) RP1405.
- Harris, M., Rutherford, H. A.: Detection of oxidation in wool. *J* 20, 555 (1938) RP1089.
- Reaction of wool with hydrogen peroxide. *J* 20, 559 (1938) RP1090.
- Base-combining capacity of wool. *J* 22, 535 (1939) RP1203.
- Photochemical decomposition of the cystine in wool. *J* 23, 597 (1939) RP1255.
- Concerning the existence of fractions of the sericin in raw silk. *J* 24, 415 (1940) RP1290.
- Photochemical reactions in silk. *J* 27, 81 (1941) RP1404.
- Harris, M., Rutherford, H. A., Minor, F. W., Martin, A. R., Oxidation of cellulose: The reaction of cellulose with periodic acid. *J* 29, 131 (1942) RP1491.
- Harris, M., Rutherford, H. A., Patterson, W. I., Reaction of silk fibroin with diazomethane. *J* 25, 451 (1940) RP1338.
- Harris, M., Rutherford, H. A., Smith, A. L., Estimation of amino nitrogen in insoluble proteins. *J* 19, 467 (1937) RP1038.

- Harris, M., Smith, A. L.:*
Oxidation of wool: Effect of hydrogen peroxide on wool. *J* 16, 301 (1936) RP875.
- Oxidation of wool: The lead acetate test for hydrogen peroxide bleached wool. *J* 16, 309 (1936) RP876.
- Oxidation of wool: Photochemical oxidation. *J* 17, 97 (1936) RP904.
- Oxidation of wool: Alkali-solubility test for determining the extent of oxidation. *J* 17, 577 (1936) RP928.
- State of the sulfur in oxidized wool. *J* 18, 623 (1937) RP998.
- Nature of the acid-dyeing process. *J* 19, 81 (1937) RP1012.
- Photochemical reactions of wool. *J* 20, 563 (1938) RP1091.
- Harris, M., Sookne, A. M.:*
Stress-strain characteristics of wool as related to its chemical constitution. *J* 19, 535 (1937) RP1043.
- Electrophoretic studies of silk. *J* 23, 299 (1939) RP1234.
- Electrophoretic studies of wool. *J* 23, 471 (1939) RP1245.
- Relation of cation exchange to the acidic properties of cotton. *J* 25, 47 (1940) RP1313.
- Surface characteristics of cotton fibers, as indicated by electrophoretic studies. *J* 26, 65 (1941) RP1359.
- Base-combining capacity of cotton. *J* 26, 205 (1941) RP1370.
- Electrophoretic studies of nylon. *J* 26, 289 (1941) RP1376.
- Mechanical properties of cellulose acetate as related to molecular chain length. *J* 30, 1 (1943) RP1513.
- Intrinsic viscosities and osmotic molecular weights of cellulose acetate fractions. *J* 34, 459 (1945) RP1654.
- Polymolecularity and mechanical properties of cellulose acetate. *J* 34, 467 (1945) RP1655.
- Harris, M., Sookne, A. M., Rutherford, H. A., Mark, H.:*
Fractionation of cellulose acetate. *J* 29, 123 (1942) RP1490.
- Harris, M., Steinhart, J.:*
Combination of wool protein with acid and base: Hydrochloric acid and potassium hydroxide. *J* 24, 335 (1940) RP1286.
- Harris, M., Steinhart, J., Fugitt, C. H.:*
Combination of wool protein with acid and base: The effect of temperature on the titration curve. *J* 25, 519 (1940) RP1343.
- Relative affinities of the anions of strong acids for wool protein. *J* 26, 293 (1941) RP1377.
- Further investigations of the affinities of anions of strong acids for wool proteins. *J* 28, 201 (1942) RP1453.
- Combination of wool protein with acids in mixtures, and its relation to the acid dyeing of wool. *J* 29, 417 (1942) RP1510.
- Combination of wool protein with weak acids. *J* 30, 123 (1943) RP1523.
- Harris, M., Whistler, R. L., Martin, A. R.:*
Determination of uronic acids in cellulosic materials. *J* 24, 13 (1940) RP1268.
- Pectic substance in cotton and its relation to the properties of the fiber. *J* 24, 555 (1940) RP1299.
- Harrison, T. R., Foote, P. D., Fairchild, C. O.:*
Pyrometric practice. *T* 14, (1920-21) T170.
- Harrison, W. N.:*
Controlling the consistency of enamel slips. *T* 22, 91 (1927-28) T356.
- Harrison, W. N., Judd, D. B., Sweo, B. J., Hickson, E. F., Eickhoff, A. J., Shaw, M. B., Paffenbarger, G. C.:*
Optical specification of light-scattering materials. *J* 19, 287 (1937) RP1026.
- Harrison, W. N., Krynskiy, A. I.:*
Blistering phenomena in the enameling of cast iron. *J* 4, 757 (1930) RP179.
- Harrison, W. N., Moore, D. G.:*
Surface tension of vitreous enamel frits at and near firing temperatures. *J* 21, 337 (1938) RP1133.
- Effects of humidity and composition on strength and Young's modulus of enamels. *J* 23, 329 (1939) RP1237.
- Weather resistance of porcelain-enamelled iron structural units. *J* 28, 735 (1942) RP1476.
- Harrison, W. N., Moore, D. G., Richmond, J. C.:*
Ceramic coatings for high-temperature protection of steel. *J* 38, 293 (1947) RP1773.
- Harrison, W. N., Shartsis, L.:*
Determination of thickness of acid-resistant portion of vitreous enamel coatings. *J* 25, 71 (1940) RP1315.
- Harrison, W. N., Stephens, R. E., Shelton, S. M.:*
Consistency of eight types of vitreous enamel frits at and near firing temperatures. *J* 20, 39 (1938) RP1063.
- Harrison, W. N., Sweo, B. J.:*
Some fusion properties of ground coat enamels as influenced by composition. *J* 10, 189 (1933) RP524.
- Harrison, W. N., Sweo, B. J., Shelton, S. M.:*
Thermal-expansion characteristics of some ground-coat enamel frits. *J* 22, 127 (1939) RP1172.
- Hart, R. W.:*
Laboratory wearing test to determine the relative wear resistance at different depths throughout the thickness of a hide. *T* 13, (1919-20) T166.
- Hart, R. W., Bowker, R. C.:*
An apparatus for measuring the relative wear of sole leathers and the results obtained with leather from the different parts of a hide. *T* 13, (1919-20) T147.
- Hart, R. W., Wormeley, P. L., Bowker, R. C., Whitmore, L. M., Churchill, J. B.:*
Effects of glucose and salts on the wearing quality of sole leather. *T* 12, (1919) T138.
- Hartford, C. E.:*
Manufacture and properties of a cellulose product (maizolith) from cornstalks and corncobs. M108 (1930).
- Hartman, C. C.:*
Determination of insoluble matter in shellac. *J* 7, 1105 (1931) RP391.
- Determination of nonvolatile matter and the calculation of "cut" of shellac varnish. *J* 25, 395 (1940) RP1333.
- Hartman, L. W., Curtis, H. L.:*
A dual bridge for the measurement of self inductance in terms of resistance and time. *J* 25, 1 (1940) RP1310.
- Hartshorn, L., Curtis, H. L., Sparks, C. M., Astbury, N. F.:*
Capacitance and power factor of a mica capacitor as measured at the Bureau of Standards and the National Physical Laboratory. *J* 8, 507 (1932) RP431.
- Hathcock, B. D., Skillman, E.:*
Tests of hollow building tiles. *T* 11, (1918-19) T120.
- Hathcock, B. D., Whittemore, H. L.:*
Some compressive tests of hollow-tile walls. *T* 17, 513 (1922-24) T238.
- Haupt, G. W., Gibson, K. S.:*
Standardization of Lovibond red glasses in combination with Lovibond 35 yellow. *J* 13, 433 (1934) RP718.
- Standardization of the luminous-transmission scale used in the specification of railroad signal glasses. *J* 22, 627 (1939) RP1209.
- Haupt, G. W., Gibson, K. S., Keegan, H. J.:*
Specification of railroad signal colors and glasses. *J* 36, 1 (1946) RP1688.
- Hazen, G., Jolliffe, C. B.:*
Establishment of radio standards of frequency by the use of a harmonic amplifier. *S* 21, 179 (1926-27) S530.
- Hazen, G., Kenyon, F.:*
Primary radio-frequency standardization, by use of the cathode-ray oscillograph. *S* 19, 445 (1923-24) S489.
- Heald, R. H.:*
Aerodynamic characteristics of automobile models. *J* 11, 285 (1933) RP591.
- Comparison of the ground-plane and image methods for representing ground effect in tests on vehicle models. *J* 13, 863 (1934) RP748.
- Air forces and yawing moments for three automobile models. *J* 13, 871 (1934) RP749.
- Heald, R. H., Ballif, P. S.:*
Effect of yaw on vane anemometers. *J* 19, 685 (1937) RP1056.
- Heald, R. H., Coleman, E. F.:*
Air infiltration through windows. BMS45 (1940).
- Heaton, V. E., Brattain, W. H.:*
Design of a portable temperature-controlled piezo oscillator. *J* 4, 345 (1930) RP153.
- Heaton, V. E., Hall, E. L., Lapham, E. G.:*
The national primary standard of radio frequency. *J* 14, 85 (1935) RP759.
- Heaton, V. E., Lapham, E. G.:*
Quartz plate mountings and temperature control for piezo oscillators. *J* 7, 683 (1931) RP366.
- Heck, G. E.:*
Structural properties of conventional wood frame constructions for walls, partitions, floors, and roofs. BMS25 (1939).

- Heck, G. E., Whittemore, H. L., Stang, A. H.*, Structural properties of "Precision-Built" frame wall and partition constructions sponsored by the Homasote Co. BMS48 (1940).
- Hedrick, A. F., Sale, P. D.*, Measurement of heat insulation and related properties of blankets. T 18, 529 (1924-25) T266.
- Heindl, R. A.*:
The thermal expansion of refractories to 1,800° C. J 10, 715 (1933) RP562.
A study of sagger clays and sagger bodies. J 15, 255 (1935) RP827.
- Heindl, R. A., Cooke, G. J.*, Fire-clay ladle sleeves. J 20, 411 (1938) RP1084.
- Heindl, R. A., Massengale, G. B., Cossette, L. G.*, Slip casting of clay pots for the manufacture of optical glass at the National Bureau of Standards. C452 (1946).
- Heindl, R. A., Mong, L. E.*:
Preparation of experimental sagger bodies according to fundamental properties. J 3, 419 (1929) RP104.
The life of the sagger as affected by varying certain properties. J 7, 1017 (1931) RP387.
Young's modulus of elasticity, strength, and extensibility of refractories in tension. J 17, 463 (1936) RP923.
Length changes and endothermic and exothermic effects during heating of flint and aluminous clays. J 23, 427 (1939) RP1243.
- Heindl, R. A., Pendergast, W. L.*:
Progress report on investigation of fire-clay bricks and the clays used in their preparation. J 3, 691 (1929) RP114.
Fire clays. Some fundamental properties at several temperatures. J 5, 213 (1930) RP194.
Olivine as a refractory. J 12, 215 (1934) RP645.
Young's modulus of elasticity at several temperatures for some refractories of varying silica content. J 13, 851 (1934) RP747.
Deformation and Young's modulus of fire-clay brick in flexure at 1220° C. J 19, 353 (1937) RP1030.
Properties of air-setting refractory-bonding mortars of the wet type. J 23, 7 (1939) RP1219.
Some properties of the dry air-setting type of refractory bonding mortar. J 28, 401 (1942) RP1461.
Some properties of heat-setting refractory mortars. J 30, 303 (1943) RP1534.
Panel tests for thermal spalling of fire-clay bricks used at high temperatures. J 34, 73 (1945) RP1630.
- Heindl, R. A., Pendergast, W. L., Mong, L. E.*, Kaolins; effect of firing temperature on some of their physical properties. J 8, 199 (1932) RP410.
- Helz, A. W.*, Spectrographic determination of sodium, potassium, and lithium in portland cement with the direct-current carbon arc. J 34, 129 (1945) RP1633.
- Helz, A. W., Scribner, B. F.*, Spectrographic determination of minor elements in portland cement. J 38, 439 (1947) RP1786.
- Henning, F., Wensel, H. T.*, The freezing point of iridium. J 10, 809 (1933) RP568.
- Henrickson, H. B.*, Thermometric lag of aircraft thermometers, thermographs, and barographs. J 5, 695 (1930) RP222.
- Henrickson, H. B., Wilson, J. L., Eaton, H. N.*, Use and testing of sphygmomanometers. T 21, 729, (1926-27) T352.
- Herschel, W. H.*:
Resistance of an oil to emulsification. T 9, (1916-17) T86.
Determination of absolute viscosity by short-tube viscosimeters. T 9, (1916-17) T100.
Standardization of the Saybolt universal viscosimeter. T 11, (1918-19) T112.
The viscosity of gasoline. T 12, (1919) T125.
The Saybolt viscosity of blends. T 13, (1919-20) T164.
The Redwood viscometer. T 16, 227 (1921-22) T210.
- Herschel, W. H., Anderson, A. H.*, Reclamation of used petroleum lubricating oils. T 17, 93 (1922-24) T223.
- Herschman, H. K.*:
Air-hardening rivet steels. T 22, 141 (1927-28) T358.
- The resistance of chromium-plated gages to wear. J 6, 295 (1931) RP276.
Effect of moderate cold-rolling on the hardness of the surface layer of 0.34-percent-carbon-steel plates. J 29, 57 (1942) RP1484.
Evaluation of the finish of a metal surface by a replica method. J 34, 25 (1945) RP1625.
- Herschman, H. K., Basil, J. L.*:
White-metal bearing alloys: Mechanical properties at different temperatures and service tests. J 10, 1 (1933) RP512.
"Tin-free" leaded bearing bronze. J 10, 591 (1933) RP551.
- Herschman, H. K., Jordan, L., Grenell, L. H.*, Tarnish resisting silver alloys. T 21, 459 (1926-27) T348.
- Herschman, H. K., Knoop, F.*, Influence of grinding treatments on the surface hardness of intaglio printing plates of 0.33-percent carbon steel. J 26, 261 (1941) RP1374.
- Hersey, M. D.*:
A relation connecting the derivatives of physical quantities. S 15, 21 (1919-20) S331.
Effect of small changes in temperature on the properties of bodies. J 4, 137 (1930) RP137.
- Hessing, H., Logan, H. L.*, Effect of artificial aging on the tensile properties and resistance to corrosion of the 24S-T aluminum alloy. J 38, 465 (1947) RP1788.
- Heuer, W. W., Leslie, R. T.*:
Study of the crystal behavior of hydrocarbons. J 18, 639 (1937) RP1000.
A continuous high-vacuum still and boiling-point apparatus and the systematic distillation of a dewaxed lubricant fraction of petroleum. J 21, 515 (1938) RP1142.
- Heyl, P. R.*:
Gravitational anisotropy in crystals. S 19, 307 (1923-24) S482.
A redetermination of the constant of gravitation. J 5, 1243 (1930) RP256.
An unrecognized property of the reversible pendulum. J 8, 657 (1932) RP444.
Architectural acoustics. C300 (1926).
Architectural acoustics. C380 (1930).
Architectural acoustics. C396 (1931).
- Heyl, P. R., Chrisler, V. L.*, Architectural acoustics. C418 (1938).
- Heyl, P. R., Chrisler, V. L., Snyder, W. F.*, The absorption of sound at oblique angles of incidence. J 4, 289 (1930) RP149.
- Heyl, P. R., Chrzanoski, P.*, A new determination of the constant of gravitation. J 29, 1 (1942) RP1480.
- Heyl, P. R., Cook, G. S.*, The value of gravity at Washington. J 17, 805 (1936) RP946.
- Hibben, J. H.*, Removal of dissolved gases from liquids by vacuum sublimation. J 3, 97 (1929) RP87.
- Hickman, C. N.*, Alternating-current resistance and inductance of single-layer coils. S 19, 73 (1923-24) S472.
- Hicks, J. F. G., Kimberly, A. E.*:
Light sensitivity of rosin paper-sizing materials. J 6, 819 (1931) RP307.
A survey of storage conditions in libraries relative to the preservation of records. M128 (1931).
- Hicks, M. M., Washburn, E. W., Bruun, J. H.*, Apparatus and methods for the separation, identification, and determination of the chemical constituents of petroleum. J 2, 467 (1929) RP45.
- Hicks-Bruun, M. M.*, An improved Victor-Meyer molecular weight apparatus. J 5, 575 (1930) RP215.
- Hicks-Bruun, M. M., Bruun, J. H.*:
The isolation of the isomers of hexane from petroleum. J 5, 933 (1930) RP239.
Determination of the benzene and the normal hexane content of a midcontinent petroleum. J 6, 869 (1931) RP311.
Isolation and determination of the cyclohexane in a midcontinent petroleum. J 7, 607 (1931) RP360.
Isolation and determination of methylcyclopentane in a midcontinent petroleum. J 7, 799 (1931) RP375.
Isolation and determination of normal heptane and of methylcyclohexane in a midcontinent petroleum. Including a determination of the phase equilibrium diagram for the condensed

- system normal heptane-methylcyclohexane. J 8, 525 (1932) RP432.
- Isolation of normal decane from petroleum by distillation and equilibrium melting. J 8, 583 (1932) RP438.
- Note on the probable presence of 2, 2-dimethylpentane in a midcontinent petroleum. J 9, 53 (1932) RP458.
- Note on the freezing point of "iso-octane" (2, 2, 4-trimethylpentane). J 9, 269 (1932) RP469.
- 1, 1-dimethylcyclopentane and 2-methylhexane in a midcontinent petroleum. J 10, 465 (1933) RP542.
- Hickson, E. F., Some properties and tests of traffic or zone paints. J 19, 21 (1937) RP1007.
- Hickson, E. F., Judd, D. B., Harrison, W. N., Sweo, B. J., Eickhoff, A. J., Shaw, M. B., Paffenbarger, G. C., Optical specification of light-scattering materials. J 19, 287 (1937) RP1026.
- Hickson, E. F., Walker, P. H.: Use of United States Government specification paints and paint materials. T 19, 27 (1924-25) T274.
- Accelerated tests of organic protective coatings. J 1, 1 (1928) RP1.
- Paint for priming plaster surfaces. M137 (1932).
- Paint manual: With particular reference to Federal specifications. BMS105 (1946).
- Hidnert, P.: Thermal expansion of copper and some of its important industrial alloys. S 17, 91 (1922) S410.
- Thermal expansion of aluminum and various important aluminum alloys. S 19, 697 (1923-24) S497.
- Thermal expansion of tantalum. J 2, 887 (1929) RP62.
- Thermal expansion of heat-resisting alloys: Nickel-chromium, iron-chromium, and nickel-chromium-iron alloys. J 7, 1031 (1931) RP388.
- Thermal expansion of bearing bronzes. J 12, 391 (1934) RP665.
- Thermal expansion of artificial graphite and carbon. J 13, 37 (1934) RP693.
- Thermal expansion of monocrystalline and polycrystalline antimony. J 14, 523 (1935) RP784.
- Thermal expansion of copper-beryllium alloys. J 16, 529 (1936) RP890.
- Thermal expansion of lead-antimony alloys. J 17, 697 (1936) RP938.
- Thermal expansion of cemented tungsten carbide. J 18, 47 (1937) RP960.
- Thermal expansion and effects of heat treatments on the growth, density, and structure of some heat-resisting alloys. J 20, 809 (1938) RP1106.
- Thermal expansion of some chromium-vanadium steels. J 24, 25 (1940) RP1269.
- Thermal expansion of electrolytic chromium. J 26, 81 (1941) RP1361.
- Thermal expansion of cast and of swaged chromium. J 27, 113 (1941) RP1407.
- Thermal expansion of some bronzes. J 30, 75 (1943) RP1518.
- Thermal expansion of titanium. J 30, 101 (1943) RP1520.
- Hidnert, P., Blair, M. G., Thermal expansivity and density of indium. J 30, 427 (1943) RP1541.
- Hidnert, P., Dickson, G.: Thermal expansion of some industrial copper alloys. J 31, 77 (1943) RP1550.
- Thermal expansion of high-silicon cast iron. J 32, 145 (1944) RP1581.
- Some physical properties of mica. J 35, 309 (1945) RP1675.
- Hidnert, P., Gero, W. B., Thermal expansion of molybdenum. S 19, 429 (1923-24) S488.
- Hidnert, P., Krider, H. S., Thermal expansion of columbium. J 11, 279 (1933) RP590.
- Hidnert, P., Schad, L. W., Preliminary determination of the thermal expansion of molybdenum. S 15, 31 (1919-20) S332.
- Hidnert, P., Souder, W. H.: Thermal expansion of insulating materials. S 15, 387 (1919-20) S352.
- Thermal expansion of nickel, monel metal, stellite, stainless steel, and aluminum. S 17, 497 (1922) S426.
- Thermal expansion of a few steels. S 17, 611 (1922) S433.
- Measurements on the thermal expansion of fused silica. S 21, 1 (1926-27) S524.
- Hidnert, P., Souder, W., Fox, J. F., Autographic thermal expansion apparatus. J 13, 497 (1934) RP722.
- Hidnert, P., Sweeney, W. T. Thermal expansion of tungsten. S 20, 587 (1924-26) S515.
- Thermal expansion of beryllium and aluminum beryllium alloys. S 22, 533 (1927-28) S565.
- Thermal expansion of alloys of the "stainless iron" type. S 22, 639 (1927-28) S570.
- Thermal expansion of graphite. T 21, 223 (1926-27) T335.
- Thermal expansion of magnesium and some of its alloys. J 1, 771 (1928) RP29.
- Thermal expansion of lead. J 9, 703 (1932) RP500.
- Hiegel, J. M., Cleaves, H. E., Properties of high-purity iron. J 28, 643 (1942) RP1472.
- Hill, E. E., Cragoe, C. S., Thermal expansions of gasolines from 0° to 30° C. J 7, 1133 (1931) RP393.
- Hill, E. E., Cross, H. C., Density of hot-rolled and heat-treated carbon steels. S 22, 451 (1927-28) S562.
- Hill, G. C., Dryden, H. L. Wind pressures on structures. S 20, 697 (1924-26) S523.
- Wind pressure on circular cylinders and chimneys. J 5, 653 (1930) RP221.
- Wind pressure on a model of a mill building. J 6, 735 (1931) RP301.
- Wind pressure on a model of the Empire State Building. J 10, 493 (1933) RP545.
- Hill, J. R., Weber, C. G. Care of film-slides and motion-picture films in libraries. J 17, 753 (1936) RP942.
- Stability of motion-picture films as determined by accelerated aging. J 17, 871 (1936) RP950.
- Evaluation of motion-picture film for permanent records. M153 (1937).
- Hinman, Jr., W. S.: Automatic volume control for aircraft radio receivers. J 7, 37 (1931) RP330.
- A radio direction finder for use on aircraft. J 11, 733 (1933) RP621.
- Hinman, Jr., W. S., Brunetti, C., Radio proximity fuse design. J 37, 1 (1946) RP1723.
- Hinman, Jr., W. S., Diamond, H., An automatic weather station. J 25, 133 (1940) RP1318.
- Hinman, Jr., W. S., Diamond, H., Dunmore, F. W., A method for the investigation of upper-air phenomena and its application to radio meteorography. J 20, 369 (1938) RP1082.
- Hinman, Jr., W. S., Diamond, H., Dunmore, F. W., Lapham, E. G., An improved radio sonde and its performance. J 25, 327 (1940) RP1329.
- Hitchcock, F. A., Stucco investigations at the Bureau of Standards with recommendations for portland cement stucco construction. C311 (1926).
- Hitchcock, F. A., Dwyer, J. R., Properties and manufacture of concrete building units. C304 (1926).
- Hoback, W. G., Peck, M. F., Phelan, V. B., Winslow, C. P., Structural properties of "PHC" prefabricated wood-frame constructions for walls, floors, and roofs sponsored by the PHC Housing Corporation. BMS90 (1942).
- Hoback, W. G., Weiss, H. L., Phelan, V. B., Structural properties of "Precision-Built, Jr." (second construction) prefabricated wood-frame wall construction sponsored by the Homasote Co. BMS89 (1942).
- Hobbs, R. B., Effect of speed of pulling jaws on the tensile strength and stretch of leather. J 26, 207 (1940) RP1321.
- Hobbs, R. B., Denison, I. A., Corrosion of ferrous metals in acid soils. J 13, 125 (1934) RP696.
- Hobbs, R. B., Kronstadt, R. A., Wearing quality of some vegetable-tanned sole leathers. J 34, 33 (1945) RP1626.
- Hock, C. W., Microscopic structure of flax and related bast fibers. J 29, 41 (1942) RP1482.
- Hock, C. W., Harris, M., Microscopic examination of cotton fibers in cuprammonium hydroxide solutions. J 24, 749 (1940) RP1309.

- Hock, C. W., McMurdie, H. F., Structure of the wool fiber as revealed by the electron microscope. J 31, 229 (1943) RP1561.
- Hock, C. W., Ramsay, R. C., Harris, M.: Microscopic structure of the cotton fiber. J 26, 93 (1941) RP1362.
- Microscopic structure of the wool fiber. J 27, 181 (1941) RP1412.
- Hock, C. W., Sookne, A. M., Harris, M., Thermal properties of moist fabrics. J 32, 229 (1944) RP1587.
- Hockman, A., Kessler, D. W., Anderson, R. E., Physical properties of terrazzo aggregates. BMS98 (1943).
- Hockman, A., Tregoning, J. J., Milliken, K. A., Sligh, W. H., Kessler, D. W., Plastic calking materials. BMS33 (1940).
- Hofer, C. E., Emley, W. E., Tests of floor coverings for post-office workrooms. J 19, 567 (1937) RP1046.
- Hoffmann, C. P., Physical tests of motor-truck wheels. T 13, (1919-20) T150.
- Hoffman, J. D., Hoffman, J. I., Leslie, R. T., Caul, H. J., Clark, L. J., Development of a hydrochloric acid process for the production of alumina from clay. J 37, 409 (1946) RP1756.
- Hoffman, J. I.: The use of zinc oxide in determinations of cobalt and manganese. J 7, 883 (1931) RP380.
- A method for the accurate determination of cobalt in magnetic and high-speed tool steels. J 8, 659 (1932) RP445.
- The determination of magnesia in phosphate rock. J 9, 487 (1932) RP484.
- Preparation of pure gallium. J 13, 665 (1934) RP734.
- Stability of aqueous solutions of acid potassium phthalate. J 15, 583 (1935) RP852.
- Decomposition of rocks and ceramic materials with a small amount of sodium carbonate. J 25, 379 (1940) RP1331.
- Hoffman, J. I., Leslie, R. T., Caul, H. J., Clark, L. J., Hoffman, J. D., Development of a hydrochloric acid process for the production of alumina from clay. J 37, 409 (1946) RP1756.
- Hoffman, J. I., Lundell, G. E. F.: Analysis of bauxite and of refractories of high alumina content. J 1, 91 (1928) RP5.
- The analysis of fluorspar. J 2, 671 (1929) RP51.
- Determination of fluorine and of silica in glasses and enamels containing fluorine. J 3, 581 (1929) RP110.
- The effect of light on silver chloride in chemical analyses. J 4, 109 (1930) RP134.
- The precipitation and ignition of magnesium ammonium phosphate. J 5, 279 (1930) RP200.
- Atomic weight of gallium. J 15, 409 (1935) RP838.
- Redetermination of the atomic weight of aluminum. J 18, 1 (1937) RP957.
- Determination of phosphoric anhydride in phosphate rock, superphosphate, and "metaphosphate." J 19, 59 (1937) RP1010.
- Analysis of phosphate rock. J 20, 607 (1938) RP1095.
- Volatilization of metallic compounds from solutions in perchloric or sulfuric acid. J 22, 465 (1939) RP1198.
- Separation and colorimetric determination of rhenium and molybdenum. J 23, 497 (1939) RP1248.
- Hoffman, J. I., Roesser, W. F., Freezing point of gallium. J 13, 673 (1934) RP735.
- Hoffman, J. I., Scribner, B. F., Purification of gallium by fractional crystallization of the metal. J 15, 205 (1935) RP823.
- Hogaboom, G. B., Slattery, T. F., Ham, L. B., "Black nickel" plating solutions. T 15, (1921) T190.
- Hoge, H. J.: Electrical conduction in the glass insulation of resistance thermometers. J 28, 489 (1942) RP1466.
- Vapor pressure, latent heat of vaporization, and triple-point temperature of N_2O . J 34, 281 (1945) RP1644.
- Heat capacity of a two-phase system, with applications to vapor corrections in calorimetry. J 36, 111 (1946) RP1693.
- Hoge, H. J., Brickwedde, F. G.: Establishment of a temperature scale for the calibration of thermometers between 14° and 83° K. J 22, 351 (1939) RP1188.
- Intercomparison of platinum resistance thermometers between -190° and 445°C . J 28, 217 (1942) RP1454.
- Hogue, J. M., Coblenz, W. W., Stair, R.: A balanced thermocouple and filter method of ultra-violet radiometry with practical applications. J 7, 723 (1931) RP370.
- The spectral erythemic reaction of the untanned human skin to ultra-violet radiation. J 8, 541 (1932) RP433.
- Tests of a balanced thermocouple and filter radiometer as a standard ultra-violet dosage intensity meter. J 8, 759 (1932) RP450.
- Measurements of ultra-violet solar radiation in various localities. J 10, 79 (1933) RP517.
- Holbrook, F. S., Manual of inspection and information for weights and measures officials. M1 (1918).
- Holler, H. D., A method of studying electrode potentials and polarization. S 20, 153 (1924-26) S504.
- Holler, H. D., Braham, J. M., The cadmium electrode for storage battery testing. T 13, (1919-20) T146.
- Holler, H. D., Pepper, E. L., Relation between composition and density of aqueous solutions of copper sulphate and sulphuric acid. B 13, 273 (1916-17) S275.
- Holler, H. D., Ritchie, L. M., Relation of voltage of dry cells to hydrogen-ion concentration. S 15, 659 (1919-20) S364.
- Holler, H. D., Schrod, J. P., Theory and performance of rectifiers. T 18, 465 (1924-25) T265.
- Holm, V. C. F.: Analytical methods employed in the analysis of high-purity iron. Determination of oxygen, nitrogen, and hydrogen. Appendix to J 23, 176 (1939) RP1226.
- Elimination of oxide films on ferrous materials by heating in vacuum. J 28, 569 (1942) RP1468.
- A study of resinous sealants for porous metal castings. J 37, 177 (1946) RP1740.
- Holm, V. C. F., Thompson, J. G.: Hydrogen-reduction method for the determination of oxygen in steel. J 21, 79 (1938) RP1114.
- Determinations of oxygen in alloy steels. J 21, 87 (1938) RP1115.
- Determinations of hydrogen in ferrous materials by vacuum extraction at 800°C and by vacuum fusion. J 26, 245 (1941) RP1373.
- Holscher, H. H., Shelton, G. R., Gases obtained from commercial fieldspars heated in vacuo. J 8, 347 (1932) RP420.
- Holt, N. B., Isbell, H. S., Oxidation of galacturonic acid and of 5-keto-gluconic acid in alkaline solution. J 35, 433 (1945) RP1680.
- Holt, W. L., Roth, F. L., Driscoll, R. L., Frictional properties of rubber. J 28, 439 (1942) RP1463.
- Holt, W. L.: Screw micrometer gages for rubber specimens. J 10, 575 (1933) RP549.
- Compression cutting test for rubber. J 12, 489 (1934) RP674.
- Holt, W. L., Cook, C. M., Measurement of the tread movement of pneumatic tires and a discussion of the probable relation to tread wear. J 1, 19 (1928) RP2.
- Holt, W. L., McPherson, A. T.: Change of volume of rubber on stretching: Effects of time, elongation, and temperature. J 17, 657 (1936) RP936.
- Toggle clamp for rubber tensile specimens. J 22, 543 (1939) RP1204.
- Holt, W. L., Roth, F. L.: Tensile properties of rubber compounds at high rates of stretch. J 23, 603 (1939) RP1256.
- Measuring the rate of wear of tire treads. J 32, 61 (1944) RP1574.
- Holt, W. L., Smith, W. H., Vulcanization and stress-strain behavior of sol, gel, and total rubber hydrocarbon. J 13, 465 (1934) RP720.
- Holt, W. L., Taylor, R. H.: Small inertia-type machine for testing brake lining. J 24, 531 (1940) RP1297.

- Effect of roughness of cast-iron brake drums in wear tests of brake linings. *J* 27, 395 (1941) RP1427.
- Holt, W. L., Tener, R. F., Effect of antioxidants on the natural and the accelerated aging of rubber. *J* 14, 667 (1935) RP795.
- Holt, W. L., Tener, R. F., Kingsbury, S. S., Tensile properties of soft rubber compounds at temperatures ranging from 70° to 147° C. *T* 22, 367 (1927-28) T364.
- Holt, W. L., Tener, R. F., Smith, W. H., Aging of soft rubber goods. *T* 21, 353 (1926-27) T342.
- Holt, W. L., Wormeley, P. L.: Power losses in automobile tires. *T* 16, 451 (1921-22) T213.
- Dynamometer tests of automobile tires. *T* 17, 559 (1922-24) T240.
- Effect of tire resistance on fuel consumption. *T* 19, 213 (1924-25) T283.
- Wearing qualities of tire treads as influenced by reclaimed rubber. *T* 19, 579 (1924-25) T294.
- Endurance tests of tires. *T* 20, 545 (1925-26) T318.
- Selection and care of garden hose. *C*37 (1927).
- Holton, W. B., Fiock, E. F., Ginnings, D. C., Calorimetric determinations of thermal properties of methyl alcohol, ethyl alcohol, and benzene. *J* 6, 881 (1931) RP312.
- Hoover, W. H., Fairchild, C. O., Peters, M. F., A new determination of the melting point of palladium. *J* 2, 733 (1929) RP65.
- Hopkins, B. S., Kiess, C. C., Kremers, H. C., Wave lengths longer than 5500 Å in the arc spectra of yttrium, lanthanum, and cerium and the preparation of pure rare earth elements. *S* 17, 317 (1922) S421.
- Horle, L. C. F., Preston, J. L., Some methods of testing radio receiving sets. *T* 18, 203 (1924-25) T256.
- Hornbrook, F. B., Kalousek, G. L., Jumper, C. H., Effects of partial prehydration and different curing temperatures on some of the properties of cement and concrete. *J* 16, 487 (1936) RP887.
- Hornbrook, F. B., Pigman, G. L., Rogers, J. S., A portable apparatus for measuring vibration in fresh concrete. *J* 20, 707 (1938) RP1101.
- Housetter, J. C., Cain, J. R., A rapid method for the determination of vanadium in steels, ores, etc., based on its quantitative inclusion by the phosphomolybdate precipitate. *T* 1, (1910-12) T8.
- Hough, J. W., Shepherd, M., Schuhmann, S., Flinn, R. H., Neal, P. A., Hazard of mercury vapor in scientific laboratories. *J* 26, 357 (1941) RP1383.
- Houseman, M. R., Keulegan, G. H., Temperature coefficient of the moduli of metals and alloys used as elastic elements. *J* 10, 289 (1933) RP531.
- Houston, D. F.: Effect of protective coatings on the absorption of moisture by gelatin-latex gas-cell fabrics. *J* 15, 163 (1935) RP818.
- Solubility of calcium 2-methylbutyrate in water. *J* 17, 55 (1936) RP902.
- Houston, D. F., Ashton, F. W., Saylor, C. P., The optical properties, densities, and solubilities of the normal formates of some metals of group II of the periodic system. *J* 11, 233 (1933) RP587.
- Houston, P. L.: A study of test methods for the purpose of developing standard specifications for paper bags for cement and lime. *T* 15, (1921) T187.
- A preliminary study of tearing instruments and tearing test methods for paper testing. *T* 15, (1921) T194.
- Houston, P. L., Miller, D. R., A study of commercial dial micrometers for measuring the thickness of paper. *T* 17, 125 (1922-24) T226.
- Howard, F. L., Preparation and some physical properties of 2,2,4,4-tetramethylpentane. *J* 24, 677 (1940) RP1306.
- Howard, F. L., Brooks, D. B., Crafton, Jr., H. C.: Physical properties of purified 2,2,3-trimethylpentane. *J* 23, 637 (1939) RP1259.
- Physical properties of some purified aliphatic hydrocarbons. *J* 24, 33 (1940) RP1271.
- Howard, F. L., Mears, T. W., Fookson, A., Pomerantz, P., Brooks, D. B., Preparation and physical properties of several aliphatic hydrocarbons and intermediates. *J* 38, 365 (1947) RP1779.
- Howard, M. L., Vinal, G. W., Effect of glass containers on the electromotive force of Weston normal cells. *J* 11, 255 (1933) RP588.
- Howe, H. M., Groesbeck, E. C., Stresses caused by cold-rolling. *T* 13, (1919-20) T163.
- Hubbard, C. C., Reclamation of gasoline used in dry cleaning. *T* 19, 141 (1924-25) T280.
- Hubbard, C. C., Goldman, M. H., Cleaning of fur and leather garments. *T* 22, 183 (1927-28) T360.
- Hubbard, C. C., Goldman, M. H., Schoffstall, C. W., Effect of dry cleaning on silks. A comparison of the effect of dry cleaning and some service conditions on the strength of silk. *T* 20, 605 (1925-26) T322.
- Hubbard, D.: Hygroscopicity of optical glasses as an indicator of serviceability. *J* 36, 365 (1946) RP1706.
- Hygroscopicity and electrode function (pH response) of glasses as a measure of serviceability. *J* 36, 511 (1946) RP1719.
- Electrode function (pH response) of potash-silica glasses. *J* 37, 223 (1946) RP1743.
- Hubbard, D., Carroll, B. H.: Sensitization of photographic emulsions by colloidal materials. *J* 1, 565 (1928) RP20.
- Spectral sensitization of photographic emulsions. Notes on bathing with pinacyanol-pinaflavol mixtures. *J* 4, 693 (1930) RP173.
- A comparison of resolving power and sensitivity of photographic plates with varying development. *J* 5, 1 (1930) RP183.
- The photographic emulsion: After ripening. *J* 7, 219 (1931) RP340.
- The photographic emulsion: The silver ion-gelatin equilibrium. *J* 7, 811 (1931) RP376.
- The photographic emulsion: Silver ion and hydrogen ion concentrations and sensitivity. *J* 8, 481 (1932) RP430.
- The photographic emulsion: Analysis for non-halide silver and soluble bromide. *J* 8, 711 (1932) RP447.
- The photographic emulsion: Variables in sensitization by dyes. *J* 9, 529 (1932) RP488.
- The photographic emulsion: The mechanism of hypersensitization. *J* 10, 211 (1933) RP525.
- The photographic emulsion: Sensitization by sodium sulphite. *J* 11, 743 (1933) RP622.
- Kinetics of reaction between silver bromide and photographic sensitizers. *J* 12, 329 (1934) RP659.
- Hubbard, D., Carroll, B. H., Kretschman, C. M., The photographic emulsion: Notes on stability of finished plates. *J* 12, 223 (1934) RP646.
- Hubbard, D., Donoghue, J. J., Thermal expansion studies of boric oxide glass and of crystalline boric oxide. *J* 27, 371 (1941) RP1425.
- Hubbard, D., Faick, C. A., Young, J. C., Finn, A. N., Index of refraction, density, and thermal expansion of some soda-alumina-silica glasses as functions of the composition. *J* 14, 133 (1935) RP762.
- Hubbard, D., Hamilton, E. H.: Effect of the chemical durability of glass on the asymmetry potential and reversibility of the glass electrode. *J* 27, 27 (1941) RP1400.
- Studies of the chemical durability of glass by an interferometer method. *J* 27, 143 (1941) RP1409.
- Titration and conductivity measurements of aqueous extracts from bottles. *J* 27, 381 (1941) RP1426.
- Hubbard, D., Hamilton, E. H., Finn, A. N., Effect of the solubility of glass on the behavior of the glass electrode. *J* 22, 339 (1939) RP1187.
- Hubbard, H. D.: The National Bureau of Standards: Its functions and activities. *C*1 (2d ed.), (1925).
- Units used to express the wave lengths of electromagnetic waves. *M*117 (1930).
- Hubbard, H. D., Fischer, L. A., Laws concerning the weights and measures of the United States. *M*20 (1st ed.), (1904).
- Hubbell, E., Whitemore, H. L., Stang, A. H., Dill, R. S., Structural, heat-transfer, and water-permeability properties of five earth-wall constructions. *B*M578 (1941).
- Huber, C. J., Fitch, T. T.: A comparison of American direct-current switchboard voltmeters and ammeters. *B* 7, 407 (1911) S163.
- A comparative study of American direct-current watt-hour meters. *B* 10, 161 (1914) S207.

- Hudson, C. S., Relations between rotatory power and structure in the sugar group. Part I (1 to 10). S 21, 241 (1926-27) S533.
- Hudson, C. S., Isbell, H. S.: Improvements in the preparation of aldonic acids. J 3, 57 (1929) RP82.
- The course of the oxidation of the aldose sugars by bromine water. J 3, 327 (1932) RP418.
- Hughes, C. W., Coblenz, W. W.: Ultra-violet reflecting power of some metals and sulphides. S 19, 577 (1923-24) S493.
- Spectral energy distribution of the light emitted by plants and animals. S 21, 521 (1926-27) S538.
- Emissive tests of paints for decreasing or increasing heat radiation from surfaces. T 18, 171 (1924-25) T254.
- Hughes, C. W., Coblenz, W. W., Dorcas, M. J.: Radiometric measurements on the carbon arc and other light sources used in phototherapy. S 21, 535 (1926-27) S539.
- Hughes, E. E., Acree, S. F.: Quantitative formation of furfural from xylose. J 21, 327 (1938) RP1132.
- Quantitative formation of furfural and methylfurfural from pentoses and methylpentoses. J 23, 293 (1939) RP1233.
- Reaction of bromine with furfural and related compounds. J 24, 175 (1940) RP1276.
- Hulett, G. A., Vinal, G. W., Studies on the silver voltmeter. B 11, 553 (1915) S240.
- Hull, L. M.: The determination of the output characteristics of electron tube generators. S 15, 497 (1919-20) S355.
- An electron tube transmitter of completely modulated waves. S 16, 259 (1920) S381.
- Hull, R. O., Blum, W., Addition agents in copper electrolytic solutions. J 5, 767 (1930) RP228.
- Hull, W. A., A comparison of the heat-insulating properties of some of the materials used in fire-resistant construction. T 12, (1919) T130.
- Hull, W. A., Ingberg, S. H., Fire resistance of concrete columns. T 18, 635 (1924-25) T272.
- Humphrey, R. L., Losse, L. H., The strength of reinforced concrete beams — results of tests of 333 beams (first series). T 1, (1910-12) T2.
- Humphreys, C. J.: Interference measurements in the first spectra of krypton and xenon. J 5, 1041 (1930) RP245.
- Hyperfine structures in the first spectra of krypton and xenon. J 7, 453 (1931) RP351.
- Third spectrum of xenon. J 16, 639 (1936) RP898.
- Interference measurements in the first spectra of neon, argon, and krypton between 4812 and 3319 Å. J 20, 17 (1938) RP1061.
- Second spectrum of xenon. J 22, 19 (1939) RP1164.
- Pressure displacements in the second spectrum of iron. J 23, 125 (1939) RP1222.
- Note on the effect of pressure on the wavelengths of the international secondary standards in the first spectrum of iron. J 24, 389 (1940) RP1288.
- Humphreys, C. J., deBruin, T. L., Meggers, W. F.: Regularities in the second spectrum of xenon. J 6, 287 (1931) RP275.
- The second spectrum of krypton. J 11, 409 (1933) RP599.
- Humphreys, C. J., Lawn, D. D., Kiess, C. C., Preliminary description and analysis of the first spectrum of uranium. J 37, 57 (1946) RP1729.
- Humphreys, C. J., Meggers, W. F.: Further description and analysis of the first spectrum of xenon. J 10, 139 (1933) RP521.
- Infrared spectra of neon, argon, and krypton. J 10, 427 (1933) RP540.
- Interference measurements in the spectra of noble gases. J 13, 293 (1934) RP710.
- Interference measurements of wave lengths in the ultraviolet spectrum of iron. J 18, 543 (1937) RP992.
- The first spectrum of antimony. J 28, 463 (1942) RP1464.
- Term analyses of the first two spectra of columbium. J 34, 477 (1945) RP1656.
- Humphreys, C. J., Meggers, W. F., de Bruin, T. L.: The first spectrum of krypton. J 3, 129 (1929) RP89.
- The first spectrum of xenon. J 3, 731 (1929) RP115.
- Further description and analysis of the first spectrum of krypton. J 7, 643 (1931) RP364.
- Zeeman effect in the second and third spectra of xenon. J 23, 683 (1939) RP1264.
- Humphreys, C. J., Plyler, E. K., Infrared emission of spectra of krypton and argon. J 38, 499, (1947) RP1790.
- Humphreys, C. J., Plyler, E. K., Stair, R., Infrared absorption spectra of twelve cyclopentanes and cyclohexanes. J 38, 211 (1947) RP1769.
- Hund, A.: Theory of determination of ultra-radio frequencies by standing waves on wires. S 19, 487 (1923-24) S491.
- Generator for audio currents of adjustable frequency with piezo-electric stabilization. S 22, 631 (1927-28) S569.
- Note on a piezo-electric generator for audio-frequencies. J 2, 355 (1929) RP40.
- Hund, A., De Groot, H. B., Radio-frequency resistance and inductance of coils used in broadcast reception. T 19, 651 (1924-25) T298.
- Hund, A., Wright, R. B., New piezo oscillations with quartz cylinders cut along the optical axis. J 4, 383 (1930) RP156.
- Hunt, F. L., Aeronautic instruments. T 17, 447 (1922-24) T237.
- Hunter, R. B.: A method of measuring frictional coefficients of walkway materials. J 5, 329 (1930) RP204.
- Methods of estimating loads in plumbing systems. BMS65 (1940).
- Water distributing systems for buildings. BMS79 (1941).
- Hunter, R. B., Golden, G. E., Back-flow prevention in over-rim water supplies. BMS28 (1939).
- Hunter, R. B., Golden, G. E., Eaton, H. N., Cross-connections in plumbing systems. J 20, 479 (1938) RP1086.
- Hunter, R. S.: Gloss investigations using reflected images of a target pattern. J 16, 359 (1936) RP879.
- Methods of determining gloss. J 18, 19 (1937) RP958.
- A multipurpose photoelectric reflectometer. J 25, 581 (1940) RP1345.
- A glossmeter for smoothness comparisons of machine-finished surfaces. J 36, 385 (1946) RP1708.
- Hunter, R. S., Eickhoff, A. J., Measurement of the fading rate of paints. J 23, 773 (1942) RP1478.
- Huntton, R. D., Weiss, A., Synchronization of oscillators. J 33, 397 (1947) RP1780.
- Hyde, E. P.: On the theory of the Matthews, and the Russell-Leonard photometers for the measurement of mean spherical and mean hemispherical intensities. B 1, 255 (1903-05) S12.
- The use of white walls in a photometric laboratory. B 1, 417 (1903-05) S20.
- Talbot's law as applied to the rotating sector disk. B 2, 1 (1906) S26.
- A comparison of the unit of luminous intensity of the United States with those of Germany, England, and France. B 3, 65 (1907) S50.
- Geometrical theory of radiating surfaces with discussion of light tubes. B 3, 81 (1907) S51.
- An explanation of the short life of frosted lamps. B 3, 341 (1907) S61.
- Hyde, E. P., Brooks, H. B., An efficiency meter for electric incandescent lamps. B 2, 145 (1906) S30.
- Hyde, E. P., Cady, F. E.: On the determination of the mean horizontal intensity of incandescent lamps by the rotating lamp method. B 2, 415 (1906) S43.
- On the determination of the mean horizontal intensity of incandescent lamps. B 3, 357 (1907) S63.
- A comparative study of plain and frosted lamps. B 4, 91 (1907-08) S72.

- Ingberg, S. H., Griffin, H. K., Robinson, W. C., Wilson, R. E.*, Fire tests of building columns. T 15, (1921) T184.
- Ingberg, S. H., Hull, W. A.*, Fire resistance of concrete columns. T 18, 635 (1924-25) T272.
- Ingberg, S. H., Mitchell, N. D.*, Fire tests of wood- and metal-framed partitions. BMS71 (1941).
- Ingels, C. W.*, National directory of commodity specifications. Classified alphabetical lists and brief descriptions of specifications of national recognition. M130 (1932).
- Insley, H.*:
 Determination of the source and the means of prevention of stones in glass. J 2, 1077 (1929) RP71.
 Structural characteristics of some constituents of portland cement clinker. J 17, 353 (1936) RP917.
 Nature of the glass in portland cement clinker. J 25, 295 (1940) RP1324.
- Insley, H., Ewell, R. H.*:
 Thermal behavior of the kaolin minerals. J 14, 615 (1935) RP792.
 Hydrothermal synthesis of kaolinite, dickite, beidellite, and nontronite. J 15, 173 (1935) RP819.
- Insley, H., Flint, E. P., Newman, E. S., Swenson, J. A.*, Relation of compositions and heats of solution of portland cement clinker. J 21, 355 (1938) RP1135.
- Insley, H., Geller, R. F.*, Thermal expansion of some silicates of elements in group II of the periodic system. J 9, 35 (1932) RP456.
- Insley, H., Glaze, F. W.*, Some optical and crystallographical properties of the alkali zinc uranyl acetates. J 12, 471 (1934) RP672.
- Insley, H., Kessler, D. W., Sligh, W. H.*, Physical, mineralogical, and durability studies on the building and monumental granites of the United States. J 25, 161 (1940) RP1320.
- Insley, H., Klein, A. A.*, The constitution and microstructure of silica brick and changes involved through repeated burnings at high temperatures. T 12, (1919) T124.
- Insley, H., McMurdie, H. F.*:
 Studies on the quaternary system $\text{CaO-MgO-2CaO.SiO}_2\text{-5CaO.3Al}_2\text{O}_3$. J 16, 467 (1936) RP884.
 Minor constituents in portland cement clinker. J 20, 173 (1938) RP1074.
- Insley, H., Parsons, W. H.*, Attack on refractory clay pots by optical glasses. J 36, 31 (1946) RP1689.
- Insley, H., Pendergast, W. L.*, The service of refractory blocks in a small experimental glass tank. J 2, 453 (1929) RP44.
- Insley, H., Steierman, B. L., Parsons, W. H.*, Size grading of diamond powders. J 36, 469 (1946) RP1716.
- Insley, H., Tool, A. Q.*, Observations on crystalline silica in certain devitrified glasses. J 21, 743 (1938) RP1152.
- Isaacs, A., McKelvy, E. C.*, Causes and prevention of the formation of noncondensable gases in ammonia absorption refrigeration machines. T 14, (1920-21) T180.
- Isaacs, A., Tuttle, J. B.*, A study of some recent methods for the determination of total sulphur in rubber. T 5, (1914-15) T45.
- Isbell, H. S.*:
 Optical rotation and ring structure in the sugar group. The optical rotation of the various asymmetric carbon atoms in the hexose and pentose sugars. J 3, 1041 (1929) RP128.
 A new crystalline calcium chloride compound of α -D-glucose and its rotation and mutarotation in aqueous solution. J 5, 741 (1930) RP226.
 The ring structure of mannose. The optical rotation of 4-glucosido- α -mannose. J 5, 1179 (1930) RP253.
 Derivatives of 4-glucosido-mannose. J 7, 1115 (1931) RP392.
 The preparation of crystalline methyl-D-glucosides by means of coordination compounds with calcium chloride. J 8, 1 (1932) RP396.
 A study of the delta lactones by the oxidation of aldoses with bromine water. J 8, 615 (1932) RP441.
 Preparation of calcium lactobionate and lactobionic δ -lactone. J 11, 713 (1933) RP618.
- A note on the purification of α -D-xylose and its mutarotation. J 13, 515 (1934) RP723.
- Optical rotations and other properties of the lead and calcium aldonates. J 14, 305 (1935) RP770.
- Preparation and properties of calcium lactobionate-calcium bromide. J 17, 331 (1936) RP914.
- Configuration of the pyranoses in relation to their properties and nomenclature. J 18, 505 (1937) RP990.
- Guloheptonic acids and α -D- α -guloheptose. J 19, 639 (1937) RP1052.
- Bromine oxidation and mutarotation measurements with α -D- β -mannoheptose and α -D- α -guloheptose. J 20, 97 (1938) RP1069.
- Action of baker's yeast on D-talose. J 22, 403 (1939) RP1191.
- Hydrolysis of turanose in alkaline solution. J 26, 35 (1941) RP1356.
- Preparation of D-mannose. J 26, 47 (1941) RP1357.
- Use of chlorites for treating raw sugars. J 27, 491 (1941) RP1436.
- Interpretation of some reactions in the carbohydrate field in terms of consecutive electron displacement. J 32, 45 (1944) RP1573.
- Preparation of lower aldonic acids by oxidation of sugars in alkaline solution. J 29, 227 (1942) RP1497.
- Synthesis of vitamin C from pectic substances. J 33, 45, (1944) RP1594.
- Isbell, H. S., Frush, H. L.*:
 The oxidation of sugars. I. The electrolytic oxidation of aldose sugars in the presence of a bromide and calcium carbonate. J 6, 1145 (1931) RP328.
 Preparation and properties of aldonic acids and their lactones and basic calcium salts. J 11, 649 (1933) RP613.
 Electrolytic oxidation of xylose in the presence of alkaline earth bromides and carbonates. J 14, 359 (1935) RP773.
 Alpha and beta methyl lyxosides, mannosides, gulosides, and heptosides of like configuration. J 24, 125 (1940) RP1274.
 Sugar acetates, acetylglycosyl halides, and orthoacetates in relation to the Walden inversion. J 27, 413 (1941) RP1429.
 Ring structures and mutarotations of the modifications of D-galacturonic acid. J 31, 33 (1943) RP1547.
 Calcium chloride compounds of D- α -glucoheptose (D-glycero-D-gulo-aldoheptose). J 31, 163 (1943) RP1555.
 Salts of galacturonic acid and their application to the preparation of galacturonic acid from pectic substances. J 32, 77 (1944) RP1576.
 Preparation of salts of galacturonic acid from beet pulp. J 33, 389 (1944) RP1616.
 Preparation of sodium strontium galacturonate from citrus products. J 33, 401, (1944) RP1617.
 Mutarotation and ring structure of mannuronic lactone. J 37, 43 (1946) RP1727.
 Preparation of mannuronic lactone from algin. J 37, 321 (1946) RP1750.
 Acetyl derivatives of certain heptoses, of glucose, and of lactulose. J 35, 111 (1945) RP1663.
- Isbell, H. S., Frush, H. L., Bates, F. J.*, Manufacture of calcium gluconate by the electrolytic oxidation of dextrose. J 8, 571 (1932) RP436.
- Isbell, H. S., Holt, N. B.*, Oxidation of galacturonic acid and of 5-keto-gluconic acid in alkaline solution. J 35, 433 (1945) RP1680.
- Isbell, H. S., Hudson, C. S.*:
 Improvements in the preparation of aldonic acids. J 3, 57 (1929) RP82.
 The course of the oxidation of the aldose sugars by bromine water. J 8, 327 (1932) RP418.
- Isbell, H. S., Jeanes, A.*, Chemical reactions of the chlorites with carbohydrates. J 27, 125 (1941) RP1408.
- Isbell, H. S., Matheson, H., Smith, E. R.*, Application of the dropping mercury electrode to the investigation of the polyhydroxy acids and lactones. J 28, 95 (1942) RP1448.
- Isbell, H. S., Pigman, W. W.*:
 The oxidation of alpha and beta glucose and a study of the isomeric forms of the sugar in solution. J 10, 337 (1933) RP534.

- Note on the thermal mutarotation of *d*-galactose, *l*-arabinose, and *d*-talose. *J* 16, 553 (1936) RP892.
- Bromine oxidation and mutarotation measurements of the alpha- and beta-aldoses. *J* 18, 141 (1937) RP969.
- β -*d*-Talose and *d*-talose acetates and orthoesters. *J* 19, 189 (1937) RP1021.
- Mutarotation of *l*-sorbitose. *J* 19, 443 (1937) RP1035.
- Pyranose-furanose interconversions with reference to the mutarotations of galactose, levulose, lactulose, and turanose. *J* 20, 773 (1938) RP1104.
- Preparation and properties of β -*d*-2-desoxygalactose. *J* 22, 397 (1939) RP1190.
- Optical rotatory relationships exhibited by aromatic and aliphatic glycosides. *J* 27, 9 (1941) RP1399.
- Isbell, H. S., Pigman, W. W., Frush, H. L., Reducing powers of various sugars with alkaline copper-citrate reagent. *J* 24, 241 (1940) RP1282.
- Ives, H. E.:
A volt scale for a watts-per-candle meter. *B* 5, 543 (1908-09) S113.
The daylight efficiency of artificial illuminants. *B* 6, 231 (1909-10) S125.
White light from the mercury arc and its complementary. *B* 6, 265 (1909-10) S128.
- Ives, H. E., Coblenz, W. W., Luminous efficiency of the firefly. *B* 6, 321 (1909-10) S132.
- Ives, H. E., Woodhull, L. R., A tungsten comparison lamp in the photometry of carbon lamps. *B* 5, 555 (1908-09) S115.
- J**
- Jackson, R. F., McDonald, E. J.:
Copper reduction of dextrose, levulose, invert sugar, and sucrose-invert-sugar mixtures in citrate-carbonate solution. *J* 34, 213 (1945) RP1688.
Reaction of periodic acid on the difructose anhydrides. *J* 35, 497 (1945) RP1683.
- Jackson, C. E., Saeger, Jr., C. M., Use of the pipette method in the fineness test of molding sand. *J* 14, 59 (1935) RP757.
- Jackson, R. F.:
Equilibrium in the system; lead acetate, lead oxide, water at 25°. *B* 11, 331 (1915) S232.
The saccharimetric normal weight and specific rotation of dextrose. *B* 13, 633 (1916-17) S293.
- Jackson, R. F., Bates, F., Constants of the quartz-wedge saccharimeter and the specific rotation of sucrose. I. The constants for the 26-gram normal weight. *B* 13, 67 (1916-17) S268.
- Jackson, R. F., Bingham, E. C., Standard substances for the calibration of viscometers. *B* 14, 59 (1918-19) S298.
- Jackson, R. F., Gillis, C. L., The double-polarization method for estimation of sucrose and the evaluation of the Clerget divisor. *S* 16, 125 (1920) S375.
- Jackson, R. F., Georgen, S. M.:
A crystalline difructose anhydride from hydrolyzed inulin. *J* 3, 27 (1929) RP79.
Note on the individualities of anhydrofructose and difructose anhydride. *J* 5, 733 (1930) RP224.
- Jackson, R. F., McDonald, E. J.:
The constant occurrence of nonreducing disaccharides in hydrolyzed inulin. *J* 5, 1151 (1930) RP251.
Two new crystalline difructose anhydrides from hydrolyzed inulin. *J* 6, 709 (1931) RP299.
Structure of difructose anhydride III (difructofuranose 1,2', 2,3'-anhydride). *J* 24, 181 (1940) RP1277.
Errors of Munson and Walker's reducing-sugar tables and the precision of their method. *J* 27, 237 (1941) RP1417.
- Jackson, R. F., Mathews, J. A.:
Some physical properties of levulose and its estimation by copper reduction methods. *J* 8, 403 (1932) RP426.
The stability of levulose in aqueous solutions of varying pH. *J* 11, 619 (1933) RP611.
Yield and purity of levulose derived from the calcium levulate process. *J* 15, 341 (1935) RP832.
- Jackson, R. F., Mathews, J. A., Chase, W. D., Analytical methods for the determination of levulose in crude products. *J* 9, 597 (1932) RP495.
- Jackson, R. F., Proffitt, M. J., Bogan, J. A.:
Dimensions of jerusalem-artichoke cossettes. *J* 17, 615 (1936) RP931.
Extraction of jerusalem-artichoke juices in an experimental diffusion battery. *J* 19, 263 (1937) RP1025.
- Jackson, R. F., Silsbee, C. G.:
The solubility of dextrose in water. *S* 17, 715 (1922) S437.
Saturation relations in mixtures of sucrose, dextrose, and levulose. *T* 18, 277 (1924-25) T259.
- Jackson, R. F., Silsbee, C. G., Proffitt, M. J., The preparation of levulose. *S* 20, 587 (1924-26) S519.
- Jackson, W. E., Kear, F. G., Applying the radio range to the airways. *J* 4, 371 (1930) RP155.
- Jager, R. E., Pollard, R. E., U. S. patents on powder metallurgy. M184 (1947).
- Jansky, Jr., C. M., A statistical study of conditions affecting the distance range of radio-telephone broadcasting stations. *T* 19, 641 (1924-25) T297.
- Jeanes, A., Isbell, H. S., Chemical reactions of the chlorites with carbohydrates. *J* 27, 125 (1941) RP1408.
- Jeffrey, G. L., Supplementary list of publications of the Bureau of Standards — July 1, 1925 to June 30, 1927. Supplement to C24 (7th ed.), (1927).
- Jeffrey, G. L., Miller, G. D.:
Supplementary list of publications of the Bureau of Standards — July 1, 1925 to February 28, 1930. Supplement to C24 (7th ed.), (1930).
Supplementary list of publications of the Bureau of Standards — July 1, 1925 to December 31, 1931. Supplement to C24 (7th ed.), (1932).
- Jencks, P. J., Maclean, M. E., Acree, S. F., Comparison of the purity of samples of organic solvents by ultraviolet spectrophotometry. *J* 34, 271 (1945) RP1643.
- Jessup, D. A., Appel, W. D., Accelerated aging test for weighted silk. *J* 15, 601 (1935) RP855.
- Jessup, D. A., Bogaty, H., Weissberg, S. G., Properties and performance of fiber tile boards. BMS77 (1941).
- Jessup, D. A., Harris, M., The effect of pH on the photochemical decomposition of silk. *J* 7, 1179 (1931) RP395.
- Jessup, D. A., Mease, R. T.:
Analysis of wool-cotton textiles. *J* 12, 75 (1934) RP635.
Analysis of textiles for cellulose-acetate rayon, silk, regenerated-cellulose rayon, cotton, and wool. *J* 15, 189 (1935) RP821.
- Jessup, D. A., Weissburg, S. G., Weber, C. G.:
Accelerated aging of fiber building boards. BMS4 (1938).
Stability of sheathing papers as determined by accelerated aging. BMS35 (1939).
Stability of fiber building boards as determined by accelerated aging. BMS50 (1940).
Stability of fiber sheathing boards as determined by accelerated aging. BMS69 (1941).
- Jessup, R. S.:
Compressibility and thermal expansion of petroleum oils in the range 0° to 300° C. *J* 5, 985 (1930) RP244.
The Thomas recording gas calorimeter. *J* 10, 99 (1933) RP519.
Heats of vaporization of eight gasolines. *J* 15, 227 (1935) RP825.
Heats of combustion of the liquid normal paraffin hydrocarbons from hexane to dodecane. *J* 18, 115 (1937) RP966.
Heat of combustion of isoprene. *J* 20, 589 (1938) RP1093.
Heats of combustion of diamond and of graphite. *J* 21, 475 (1938) RP1140.
Heat of combustion of benzoic acid, with special reference to the standardization of bomb calorimeters. *J* 29, 247 (1942) RP1499.
Note on the density of combustion of benzoic acid. *J* 36, 421 (1946) RP1711.
- Jessup, R. S., Cummings, A. D., Heats of combustion of rubber and of rubber-sulphur compounds. *J* 13, 357 (1934) RP713.

- Jessup, R. S., Green, C. B., Heat of combustion of standard sample benzoic acid. J 13, 469 (1934) RP721.
- Jessup, R. S., Meyers, C. H., A multiple manometer and piston gages for precision measurements. J 6, 1061 (1931) RP324.
- Jessup, R. S., Prosen, E. J., Rossini, F. D., Heat of formation of carbon dioxide and of the transition of graphite into diamond. J 33, 447 (1944) RP1620.
- Jessup, R. S., Roberts, D. E., Walter, W. W., Heats of combustion and solution of liquid styrene and solid polystyrene, and the heats of polymerization of styrene. J 38, 627 (1947) RP1801.
- Jessup, R. S., Rossini, F. D., Heat and free energy of formation of carbon dioxide, and of the transition between graphite and diamond. J 21, 491 (1938) RP1141.
- Jimeno-Gil, E., Rawdon, H. S., A study of the relation between the Brinell hardness and the grain size of annealed carbon steels. S 16, 557 (1920) S397.
- Johnson, C., Wilson, B., Calibration of testing machines under dynamic loading. J 19, 41 (1937) RP1009.
- Johnson, H. L., Rossini, F. D., Knowlton, J. W., Heat and free energy of formation of deuterium oxide. J 23, 369 (1940) RP1287.
- Johnson, H. V., Cement-lime mortars. T 20, 241 (1925-26) T308.
- Johnson, P. V., Stull, R. T.:
Performance of a hollow-ware extrusion machine with different combinations of augers, spacers, and dies. J 14, 711 (1935) RP798.
Relation between moisture content and flow-point pressure of plastic clay. J 22, 329 (1939) RP1186.
Some properties of the pore system in bricks and their relation to frost action. J 25, 711 (1940) RP1349.
- Johnson, W. G., French, H. J., Effect of heat-treatment on the mechanical properties of one per cent carbon steel. T 16, 93 (1921-22) T206.
- Johnson, W. H., Parsons, W. H., Thermal expansion of concrete aggregate materials. J 32, 101 (1944) RP1578.
- Johnson, W. H., Prosen, E. J., Rossini, F. D.:
Heats of combustion and isomerization of the eight $C_{10}H_{12}$ alkylbenzenes. J 35, 141 (1945) RP1665.
Heats of combustion and formation at 25° C of the alkylbenzenes through $C_{10}H_{14}$ and of the higher normal monoalkylbenzenes. J 36, 455 (1946) RP1714.
Heats of combustion of four cyclopentane and five cyclohexane hydrocarbons. J 36, 463 (1946) RP1715.
Heats of formation and combustion of the normal alkylcyclopentanes and cyclohexanes and the increment per CH_2 group for several homologous series of hydrocarbons. J 37, 51 (1946) RP1728.
Heats of combustion and isomerization of six nonanes. J 38, 419 (1947) RP1783.
- Johnston, R. S.:
An investigation of oxyacetylene welding and cutting blowpipes with special reference to their economy in operation, safety, and design. T 15, (1921) T200.
Compressive strength of column web plates and wide web columns. T 20, 733 (1925-26) T327.
- Jolliffe, C. B., Dellinger, J. H., Classification of radio subjects — An extension of the Dewey decimal system. C385 (1930).
- Jolliffe, C. B., Dellinger, J. H., Parkinson, T., Cooperative measurements of radio fading in 1925. S 22, 419 (1927-28) S561.
- Jolliffe, C. B., Hazen, G., Establishment of radio standards of frequency by the use of a harmonic amplifier. S 21, 179 (1926-27) S530.
- Jolliffe, C. B., Rodman, J. A., A quantitative study of regeneration by inductive feed back. S 19, 419 (1923-24) S487.
- Jones, G. W., Brumbaugh, I. V., Carbon monoxide in the products of combustion from natural gas burners. T 16, 431 (1921-22) T212.
- Jones, S. A., Weights and measures in Congress. Historical summary covering the period of the Continental Congress to and including the adoption of the Joint Resolutions of 1836 and 1838. M122 (1936).
- Jordan, L., Production, heat treatment, and properties of iron alloys. C409 (1936).
- Jordan, L., Digges, T. G., Hardening characteristics and other properties of commercial one-percent-carbon tool steels. J 15, 385 (1935) RP837.
- Jordan, L., Eckman, J. R.:
Gases in metals: II. The determination of oxygen and hydrogen in metals by fusion in vacuum. S 20, 445 (1924-26) S514.
Gases in metals: III. The determination of nitrogen in metals by fusion in vacuum. S 22, 467 (1927-28) S563.
- Jordan, L., Grenell, L. H., Herschman, H. K., Tarnish resisting silver alloys. T 21, 459 (1926-27) T348.
- Jordan, L., Kahlbaum, W.:
Tensile properties of cast nickel-chromium-iron alloys and of some alloy steels at elevated temperatures. J 9, 327 (1932) RP474.
Creep at elevated temperatures in chromium-vanadium steels containing tungsten or molybdenum. J 9, 441 (1932) RP481.
- Jordan, L., Kjerrman, B., A study of the hydrogen-antimony-tin method for the determination of oxygen in cast irons. J 1, 71 (1928) RP25.
- Jordan, L., McCrae, J. V., Dowdell, R. L., A study of the so-called "over-reduced" condition in molten steel. J 5, 1123 (1930) RP250.
- Jordan, L., Rawdon, H. S., Groesbeck, E. C., Electric-arc welding of steel: I. Properties of the arc-fused metal. T 14, (1920-21) T179.
- Jordan, L., Rogers, B. A., Schoonover, I. C., Silver: Its properties and industrial uses. C412 (1936).
- Jordan, L., Rosenberg, S. J., Influence of oxide films on the wear of steels. J 13, 267 (1934) RP708.
- Jordan, L., Swanger, W. H., The properties of pure nickel. J 5, 1291 (1930) RP257.
- Jordan, L., Swindells, F. E.:
The decarburization of ferrochromium by hydrogen. S 18, 327 (1922-23) S443.
Gases in metals: I. The determination of combined nitrogen in iron and steel and the change in form of nitrogen by heat treatment. S 18, 499 (1922-23) S457.
- Jordan, L., Vacher, H. C., The determination of oxygen and nitrogen in irons and steels by the vacuum-fusion method. J 7, 375 (1931) RP346.
- Judd, D. B.:
Effect of temperature change on the color of red and yellow Lovibond glasses. J 1, 859 (1928) RP31.
Least retinal illumination by spectral light required to evoke the "blue arcs of the retina." J 2, 441 (1929) RP43.
Reduction of data on mixture of color stimuli. J 4, 515 (1930) RP163.
Precision of color temperature measurements under various observing conditions; a new color comparator for incandescent lamps. J 5, 1161 (1930) RP252.
Extension of the standard visibility function to intervals of 1 millimicron by third-difference osculatory interpolation. J 6, 465 (1931) RP289.
Interpolation of the O. S. A. "excitation" data by the fifth-difference osculatory formula. J 7, 85 (1931) RP334.
A general formula for the computation of colorimetric purity. J 7, 827 (1931) RP377.
Sources of error in measuring opacity of paper by the contrast-ratio method. J 12, 345 (1934) RP660.
Opacity standards. J 13, 281 (1934) RP709.
A Maxwell triangle yielding uniform chromaticity scales. J 14, 41 (1935) RP756.
Changes in color temperature of tungsten-filament lamps at constant voltage. J 17, 679 (1936) RP937.
Estimation of chromaticity differences and nearest color temperature on the standard 1931 ICI colorimetric coordinate system. J 17, 771 (1936) RP944.
Hue, saturation, and lightness of surface colors with chromatic illumination. J 24, 293 (1940) RP1285.
Fresnel reflection of diffusely incident light. J 29, 329 (1942) RP1504.

- Standard response functions for protanopic and deuteranopic vision. *J* 33, 407 (1944) RP1618.
- Color standard for ruby mica. *J* 35, 245 (1945) RP1671.
- Judd, D. B., Gibson, K. S., Note on the effect of a cover glass in reflectance measurements. *J* 16, 261 (1936) RP872.
- Judd, D. B., Harrison, W. N., Sweo, B. J., Hickson, E. F., Eickhoff, A. J., Shaw, M. B., Paffenbarger, G. C., Optical specification of light-scattering materials. *J* 19, 287 (1937) RP1026.
- Judd, D. B., Kelly, K. L., Method of designating colors. *J* 23, 355 (1939) RP1239.
- Judd, D. B., Priest, I. G., Brickwedde, F. G., Minimum perceptible colorimetric purity as a function of dominant wave length. *J* 20, 673 (1938) RP1099.
- Judd, D. B., Priest, I. G., Gibson, K. S., Walker, G. K., Calibration of sixty-five 35-yellow Lovibond glasses. *J* 2, 793 (1929) RP58.
- Judd, D. B., Reitmann, G., Keegan, H. J., Spectrophotometric and colorimetric determination of the TCCA standard color cards. *J* 36, 209 (1946) RP1700.
- Judd, D. B., Wensel, H. T., Roeser, W. F., Establishment of a scale of color temperature. *J* 12, 527 (1934) RP677.
- Judson, E. B., Comparison of data on the ionosphere, sunspots, and terrestrial magnetism. *J* 17, 323 (1936) RP913.
- Judson, E. B., Kirby, S. S., Recent studies of the ionosphere. *J* 14, 469 (1935) RP780.
- Judson, E. B., Kirby, S. S., Gilliland, T. R., Ionosphere studies during partial solar eclipse of February 3, 1935. *J* 16, 213 (1936) RP868.
- Judson, L. V.:
Effect of concentrated loads on the length of measuring tapes. *S* 21, 385 (1926-27) S534.
A study of sieve specifications. *T* 20, 597 (1925-26) T321.
Testing of measuring tapes at the Bureau of Standards. C328 (1927).
Calibration of a divided scale. C329 (1927).
Testing of line standards of length. C332 (1927).
- Judson, L. V., Page, B. L., Calibrations of the line standards of length of the National Bureau of Standards. *J* 13, 757 (1934) RP743.
- Jumper, C. H., Tests of integral and surface waterproofings for concrete. *J* 7, 1147 (1931) RP394.
- Jumper, C. H., Hornibrook, F. G., Kalousek, G. L., Effects of partial prehydration and different curing temperatures on some of the properties of cement and concrete. *J* 16, 487 (1936) RP887.
- Jumper, C. H., Kalousek, G. L., Tregoning, J. J., Composition and physical properties of aqueous extracts from portland cement clinker pastes containing added materials. *J* 30, 215 (1943) RP1530.
- Jumper, C. H., Newman, E. S., Blaine, R. L., Kalousek, G. L., Effects of added materials on some properties of hydrating portland cement clinkers. *J* 30, 281 (1943) RP1533.
- Kahlbaum, W., Dowdell, R. L., Tucker, W. A., The tensile properties of alloy steels at elevated temperatures as determined by the "short-time" method. *J* 6, 199 (1931) RP270.
- Kahlbaum, W., French, H. J., Peterson, A. A., Flow characteristics of special Fe-Ni-Cr alloys and some steels at elevated temperatures. *J* 5, 125 (1930) RP192.
- Kahlbaum, W., Jordan, L.:
Tensile properties of cast nickel-chromium-iron alloys and some alloy steels at elevated temperatures. *J* 9, 327 (1932) RP474.
Creep at elevated temperatures in chromium-vanadium steels containing tungsten or molybdenum. *J* 9, 441 (1932) RP481.
- Kahler, H., Coblenz, W. W.:
Some optical and photoelectric properties of molybdenite. *S* 15, 121 (1919-20) S338.
Reflecting power of stellite and lacquered silver. *S* 15, 215 (1919-20) S342.
Spectral photoelectric sensitivity of silver sulphide and several other substances. *S* 15, 231 (1919-20) S344.
A new spectrophotometer and measurements of the component radiations from the sun and from a quartz mercury vapor lamp. *S* 16, 233 (1920) S378.
- Kahler, H., Coblenz, W. W., Long, M. B., The decrease in ultra-violet and total radiation with usage of quartz mercury vapor lamps. *S* 15, 1 (1919-20) S330.
- Kalousek, G. L., Studies of portions of the quaternary soda-lime-silica-water at 25° C. *J* 32, 285 (1944) RP1590.
- Kalousek, G. L., Hornibrook, F. G., Jumper, C. H., Effects of partial prehydration and different curing temperatures on some of the properties of cement and concrete. *J* 16, 487 (1936) RP887.
- Kalousek, G. L., Jumper, C. H., Tregoning, J. J., Composition and physical properties of aqueous extracts from portland cement clinker pastes containing added materials. *J* 30, 215 (1943) RP1530.
- Kalousek, G. L., Newman, E. S., Blaine, R. L., Jumper, C. H., Effects of added materials on some properties of hydrating portland cement clinkers. *J* 30, 281 (1943) RP1533.
- Kanagy, J. R.:
Soluble decomposition products in aged vegetable-tanned leathers. *J* 17, 247 (1936) RP909.
Behavior of leather in the oxygen bomb. *J* 18, 713 (1937) RP1004.
Influence of copper and iron salts on the behavior of leather in the oxygen bomb. *J* 20, 849 (1938) RP1109.
Accelerated aging of leather in the oxygen bomb at 100° C. *J* 21, 241 (1938) RP1128.
Effect of oxygen and moisture on the stability of leather at elevated temperatures. *J* 25, 149 (1940) RP1319.
Evolution of carbon dioxide and water from vegetable-tanned leathers at elevated temperatures. *J* 27, 257 (1941) RP1418.
Adsorption of water vapor by untanned hide and various leathers at 100° F. *J* 38, 119 (1947) RP1763.
Chemistry of collagen. C458 (1947).
- Kanagy, J. R., Bowker, R. C., Wallace, E. L., Influence of magnesium sulphate on the deterioration of vegetable-tanned leather by sulphuric acid. *J* 14, 121 (1935) RP761.
- Kanagy, J. R., Charles, A. M., Abrams, E., Tener, R. F., Effects of mildew on vegetable-tanned strap leather. *J* 36, 441 (1946) RP1713.
- Kanagy, J. R., Harris, M., Amino-nitrogen contents of wool and collagen. *J* 14, 763 (1935) RP787.
- Kanagy, J. R., Kronstadt, R. A., Iron as a tanning agent. *J* 31, 279 (1943) RP1566.
- Kanagy, J. R., Tobias, P. E., Accelerated aging of lace leathers. *J* 29, 51 (1942) RP1483.
- Kanagy, J. R., Wallace, E. L., Deterioration of vegetable-tanned leathers containing sulphuric acid and glucose. *J* 15, 523 (1935) RP846.
Density of leather and its significance. *J* 31, 169 (1943) RP1556.
- Kanagy, J. R., Wallace, E. L., Critchfield, C. L., Influence of some sulphur-containing tanning materials on the deterioration of vegetable-tanned leathers by sulphuric acid. *J* 15, 369 (1935) RP835.
- Kanegis, J., and others, Mechanical properties of metals and alloys. C447 (1943).
- Kanolt, C. W.:
Melting points of some refractory oxides. *B* 10, 295 (1914) S212.
Nonflammable liquids for cryostats. *S* 20, 619 (1924-26) S520.
The melting points of fire brick. *T* 1, (1910-12) T10.
- Karcher, J. C.:
A piezo electric method for the instantaneous measurement of high pressures. *S* 18, 257 (1922-23) S445.
A method for the measurement of sound intensity. *S* 19, 105 (1923-24) S473.
- Karr, C. P., Merica, P. D.:
Failure of brass. 3.—Initial stress produced by the "burning in" of manganese bronze. *T* 8, (1916-17) T84.
Some tests of light aluminum casting alloys—the effect of heat treatment. *T* 12, (1919) T139.
- Karr, C. P., Rawdon, H. S., Standard test specimens of zinc bronze (Cu 88, Sn 10, Zn 2)—Parts I and II. *T* 6, (1915-16) T59.

- Karrer, E., Use of the Ulbricht sphere in measuring reflection and transmission factors. S 17, 203 (1922) S415.
- Karrer, E., Tyndall, E. P. T.: Contrast sensibility of the eye. S 15, 679 (1919-20) S366.
- Relative spectral transmission of the atmosphere. S 17, 377 (1920) S389.
- Kasper, C.: The structure of the chromic acid plating bath; the theory of chromium deposition. J 9, 353 (1932) RP476.
- The deposition of chromium from solutions of chromic and chromous salts. J 11, 515 (1933) RP604.
- Mechanism of chromium deposition from the chromic acid bath. J 14, 693 (1935) RP797.
- Rapid electrodeposition of iron from ferrous chloride baths. J 18, 535 (1937) RP991.
- Kasper, C., Liddel, U., Spectral differentiation of pure hydrocarbons: A near infrared absorption study. J 11, 599 (1933) RP610.
- Kear, F. G., Phase synchronization in directive antenna arrays with particular application to the radio range beacon. J 11, 123 (1933) RP581.
- Kear, F. G., Diamond, H., A 12-course radio range for guiding aircraft with tuned reed visual indication. J 4, 351 (1930) RP154.
- Kear, F. G., Jackson, W. E., Applying the radio range to the airways. J 4, 371 (1930) RP155.
- Kear, F. G., Wintermute, G. H., A simultaneous radiotelephone and visual range beacon for the airways. J 7, 261 (1931) RP341.
- Keegan, H. J., Gibson, K. S., Haupt, G. W., Specification of railroad signal colors and glasses. J 36, 1 (1946) RP1688.
- Keegan, H. J., Reimann, G., Judd, D. B., Spectrophotometric and colorimetric determination of the TCCA standard color cards. J 36, 209 (1946) RP1700.
- Keegan, H. J., Sager, E. E., Acree, S. F., Basic ionization constant of metacresolsulfonphthalein; pH values and salt effects. J 31, 323 (1943) RP1569.
- Kellberg, I. N., Burgess, G. K., Electrical resistance and critical ranges of pure iron. B 11, 457 (1915) S236.
- Kelly, K. L., Color designations for lights. J 31, 271 (1943) RP1565.
- Kelly, K. L., Gibson, K. S., Nickerson, D., Tristimulus specification of the Munsell book of color from spectrophotometric measurements. J 31, 55 (1943) RP1549.
- Kelly, K. L., Judd, D. B., Method of designating colors. J 23, 355 (1939) RP1239.
- Kennard, R. E., An optical method for measuring temperature distribution and convective heat transfer. J 8, 787 (1932) RP452.
- Kennedy, R. J., A method of determining the dew points of fuel-air mixtures. S 20, 47, (1924-26) S500.
- Kenrick, G. W., Gilliland, T. R., Preliminary note on an automatic recorder giving a continuous height record of the Kennelly-Heaviside layer. J 7, 783 (1931) RP373.
- Kenrick, G. W., Gilliland, T. R., Norton, K. A., Investigations of Kennelly-Heaviside layer heights for frequencies between 1,600 and 8,650 kilocycles per second. J 7, 1083 (1931) RP390.
- Kenyon, F., Hazen, G., Primary radio-frequency standardization, by use of the cathode-ray oscillograph. S 19, 445 (1923-24) S489.
- Kessler, D. W.: Physical and chemical tests of the commercial marbles of the United States. T 12, (1919) T123.
- Exposure tests on colorless waterproofing materials. T 18, 1 (1924-25) T248.
- Permeability of stone. T 20, 155 (1925-26) T305.
- A study of problems relating to the maintenance of interior marble. T 21, 591 (1926-27) T350.
- Wear resistance of natural stone flooring. J 11, 635 (1933) RP612.
- Experiments on exterior waterproofing materials for masonry. J 14, 317 (1935) RP771.
- Action of "hypo" solution on stone tanks. J 16, 161 (1936) RP864.
- Kessler, D. W., Hockman, A., Anderson, R. E., Physical properties of terrazzo aggregates. BMS98 (1943).
- Kessler, D. W., Insley, H., Sligh, W. H., Physical, mineralogical, and durability studies on the building and monumental granites of the United States. J 25, 161 (1940) RP1320.
- Kessler, D. W., Sligh, W. H.: Physical properties of the principal commercial limestones used for building construction in the United States. T 21, 497 (1926-27) T349.
- Physical properties and weathering characteristics of slate. J 9, 377 (1932) RP477.
- Kessler, D. W., Tregoning, J. J., Milliken, K. A., Hockman, A., Sligh, W. H., Plastic calking materials. BMS33 (1940).
- Keulegan, G. H.: Statical hysteresis in the flexure of bars. T 21, 145 (1926-27) T332.
- Statical hysteresis in cycles of equal load range. T 22, 379 (1927-28) T365.
- On the vibration of U-bars. J 6, 553 (1931) RP293.
- Investigation of the method of determining the relation of statical hysteresis and flexural stress by measurement of the decrement of a freely-vibrating U-bar. J 8, 635 (1932) RP443.
- Laws of turbulent flow in open channels. J 21, 707 (1938) RP1151.
- Equation of motion for the steady mean flow of water in open channels. J 29, 97 (1942) RP1488.
- Laminar flow at the interface of two liquids. J 32, 303 (1944) RP1591.
- Keulegan, G. H., Beij, K. H., Pressure losses for fluid flow in curved pipes. J 18, 89 (1937) RP965.
- Keulegan, G. H., Houseman, M. R., Temperature coefficient of the moduli of metals and alloys used as elastic elements. J 10, 289 (1933) RP531.
- Keulegan, G. H., Patterson, G. W.: Mathematical theory of irrotational translation waves. J 24, 47 (1940) RP1272.
- Effect of turbulence and channel slope on translation waves. J 30, 461 (1943) RP1544.
- Keulegan, G. H., Tuckerman, L. B., Eaton, H. N., A fabric tension meter for use on aircraft. T 20, 581 (1925-26) T320.
- Kharasch, M. S., Heats of combustion of organic compounds. J 2, 359 (1929) RP41.
- Kiess, C. C.: Wave-length measurements in the arc spectra of neodymium and samarium. S 18, 201 (1922-23) S442.
- Wave length measurements in the arc spectra of gadolinium and dysprosium. S 18, 695 (1922-23) S466.
- Series in the arc spectrum of molybdenum. S 19, 113 (1923-24) S474.
- Wave-length measurements in the arc and spark spectra of zirconium. S 22, 47 (1927-28) S548.
- Interferometer measurements of wave lengths in the vacuum arc spectra of titanium and other elements. J 1, 75 (1928) RP4.
- Terms of the arc and spark spectra of chromium. J 5, 775 (1930) RP229.
- The arc spectrum of phosphorus. J 8, 393 (1932) RP425.
- A new description and analysis of the arc spectrum of chlorine. J 10, 827 (1933) RP570.
- Arc spectrum of silicon in the red and infrared. J 11, 775 (1933) RP624.
- Arc spectrum of copper in the infrared. J 14, 519 (1935) RP783.
- Infrared arc spectrum of chromium. J 15, 79 (1935) RP812.
- Infrared spectra of iron, titanium, and carbon. J 20, 33 (1938) RP1062.
- Extension and revision of the arc spectrum of silicon. J 21, 185 (1938) RP1124.
- Infrared arc spectrum of germanium. J 24, 1 (1940) RP1266.
- Kiess, C. C., Burns, K., Meggers, W. F., Standard solar wave lengths (3952 to 7148 Å). J 1, 297 (1928) RP11.
- Kiess, C. C., deBruin, T. L.: The arc spectrum of chlorine and its structure. J 2, 1117 (1929) RP73.
- The arc spectrum of bromine and its structure. J 4, 667 (1930) RP172.
- Second spectrum of chlorine and its structure. J 23, 443 (1939) RP1244.

- Kiess, C. C., Hopkins, B. S., Kremers, H. C., Wave lengths longer than 5500 Å in the arc spectra of yttrium, lanthanum, and cerium and the preparation of pure rare earth elements. S 17, 317 (1922) S421.
- Kiess, C. C., Humphreys, C. J., Lawn, D. D., Preliminary description and analysis of the first spectrum of uranium. J 37, 57 (1946) RP1729.
- Kiess, C. C., Kiess, H. K.:
The structure of the spectrum of singly ionized zirconium. J 5, 1205 (1930) RP255.
The structure of the arc spectrum of zirconium. J 6, 621 (1931) RP296.
Preliminary list of terms for the arc spectrum of tantalum. J 11, 277 (1933) RP589.
- Kiess, C. C., Lang, R. J., The structure of the spectra of doubly and trebly ionized zirconium. J 5, 305 (1930) RP202.
- Kiess, C. C., Meggers, W. F.:
Wave lengths in the red and infra-red spectra of iron, cobalt, and nickel arcs. B 14, 637 (1918-19) S324.
Wave lengths longer than 5500 Å in the arc spectra of seven elements. S 16, 51 (1920) S372.
Interferometer measurements of the longer waves in the iron arc spectrum. S 19, 273 (1923-24) S479.
Tables of theoretical Zeeman effects. J 1, 641 (1928) RP23.
Infra-red arc spectra photographed with xencyanine. J 9, 309 (1932) RP473.
- Kiess, C. C., Meggers, W. F., Burns, K., Redetermination of secondary standards of wave length from the new international iron arc. S 19, 263 (1923-24) S478.
- Kiess, C. C., Meggers, W. F., Stimson, F. J., Practical spectrographic analysis. S 18, 235 (1922-23) S444.
- Kiess, C. C., Stowell, E. Z., First spectrum of tantalum. J 12, 459 (1934) RP671.
- Kiess, H. K., Kiess, C. C.:
The structure of the spectrum of singly ionized zirconium. J 5, 1205 (1930) RP255.
The structure of the arc spectrum of zirconium. J 6, 621 (1931) RP296.
Preliminary list of terms for the arc spectrum of tantalum. J 11, 277 (1933) RP589.
- Kilpatrick, J. E., Pitzer, K. S.:
Heat content, free-energy function, entropy, and heat capacity of ethylene, propylene, and the four butenes, to 1,500° K. J 37, 163 (1946) RP1738.
Normal coordinate analysis of the vibrational frequencies of ethylene, propylene, *cis*-2-butene, *trans*-2-butene, and isobutene. J 38, 191 (1947) RP1768.
- Kilpatrick, J. E., Prosen, E. J., Pitzer, K. S., Rossini, F. D., Heats, equilibrium constants, and free energies of formation of the monoolefin hydrocarbons. J 36, 559 (1946) RP1722.
- Kilpatrick, J. E., Rossini, F. D., Pitzer, K. S., Taylor, W. J., Ebert, J. P., Beckett, C. W., Williams, H. G., Werner, H. G., Tables of selected values of hydrocarbons. C461 (1947).
- Kilpatrick, J. E., Wagman, D. D., Pitzer, K. S., Rossini, F. D., Heats, equilibrium constants, and free energies of formation of the acetylene hydrocarbons through the pentyne, to 1,500° K. J 35, 467 (1945) RP1682.
- Kilpatrick, J. E., Wagman, D. D., Taylor, W. J., Pitzer, K. S., Rossini, F. D., Heats, free energies, and equilibrium constants of some reactions involving O₂, H₂, H₂O, C, CO, CO₂, and CH₄. J 34, 143 (1945) RP1634.
- Kimberly, A. E., Deteriorative effect of sulphur dioxide upon paper in an atmosphere of constant humidity and temperature. J 8, 159 (1932) RP407.
- Kimberly, A. E., Emley, A. L.:
A study of the deterioration of book papers in libraries. M140 (1933).
A study of the removal of sulphur dioxide from library air. M142 (1933).
- Kimberly, A. E., Hicks, J. F. G.:
Light sensitivity of rosin paper-sizing materials. J 6, 819 (1931) RP307.
A survey of storage conditions in libraries relative to the preservation of records. M128 (1931).
- Kimberly, A. E., Scribner, B. W.:
Summary report of Bureau of Standards research on preservation of records. M144 (1934).
Summary report of National Bureau of Standards research on preservation of records. M154 (1937).
- Kimberly, A. E., Zimmerman, E. W., Weber, C. G., Relation of ink to the preservation of written records. J 14, 463 (1935) RP779.
- King, A. S., Meggers, W. F., Arc and spark spectra of columbium. J 16, 385 (1936) RP881.
- Kingsbury, S. S., Tener, R. F., Holt, W. L., Tensile properties of soft rubber compounds at temperatures ranging from -70° to +147° C. T 22, 367 (1927-28) T364.
- Kinnison, C. S., A study of the Atterberg plasticity method. T 5, (1914-15) T 46.
- Kinnison, C. S., Bleininger, A. V., Viscosity of porcelain bodies high in feldspar. T 5, (1914-15) T50.
- Kirby, S. S., Radio field-intensity and distance characteristics of a high, vertical broadcast antenna. J 16, 289 (1936) RP874.
- Kirby, S. S., Berkner, L. V., Gilliland, T. R., Norton, K. A., Radio observations of the Bureau of Standards during the solar eclipse of August 31, 1932. J 11, 829 (1933) RP629.
- Kirby, S. S., Berkner, L. V., Stuart, D. M., Studies of the ionosphere and their application to radio transmission. J 12, 15 (1934) RP632.
- Kirby, S. S., Gilliland, T. R., Judson, E. B., Ionosphere studies during partial solar eclipse of February 3, 1935. J 16, 213 (1936) RP868.
- Kirby, S. S., Gilliland, T. R., Smith, N., Reymer, S. E.:
Characteristics of the ionosphere and their application to radio transmission. J 18, 645 (1937) RP1001.
Maximum usable frequencies for radio sky-wave transmission, 1933 to 1937. J 20, 627 (1938) RP1096.
- Kirby, S. S., Judson, E. B., Recent studies of the ionosphere. J 14, 469 (1935) RP780.
- Kirby, S. S., Norton, K. A., Radio field intensity measurements at frequencies from 285 to 5,400 kilocycles per second. J 8, 463 (1932) RP429.
- Kirby, S. S., Norton, K. A., Lester, G. H., An analysis of continuous records of field intensity at broadcast frequencies. J 13, 897 (1934) RP752.
- Kirby, S. S., Smith, N., Gilliland, T. R.:
Trends of characteristics of the ionosphere for half a sunspot cycle. J 21, 835 (1938) RP1159.
Applications of graphs of maximum usable frequency to communication problems. J 22, 81 (1939) RP1167.
- Kirkpatrick, F. A., The effect of the size of grog in fire-clay bodies. T 10, (1917-18) T104.
- Kjerrman, B., Jordan, L., A study of the hydrogen-antimony-tin method for the determination of oxygen in cast irons. J 1, 701 (1928) RP25.
- Klein, A. A., Constitution and microstructure of porcelain. T 8, (1916-17) T80.
- Klein, A. A., Bates, P. H., Properties of the calcium silicates and calcium aluminate occurring in normal portland cement. T 8, (1916-17) T78.
- Klein, A. A., Insley, H., The constitution and microstructure of silica brick and changes involved through repeated burnings at high temperatures. T 12, (1919) T124.
- Klein, A. A., Phillips, A. J., Hydration of portland cement. T 5, (1914-15) T43.
- Klekotka, J. F., Finn, A. N., On a modified method for decomposing aluminous silicates for chemical analysis. J 4, 809 (1930) RP180.
- Kline, G. M.:
Moisture relations of aircraft fabrics. J 14, 67 (1935) RP758.
Fire-resistant doped fabric for aircraft. J 14, 575 (1935) RP788.
Permeability to moisture of synthetic resin finishes for aircraft. J 18, 235 (1937) RP974.
Organic plastics. C411 (1936).
- Kline, G. M., Acree, S. F.:
A study of the method for titrating aldose sugars with standard iodine and alkali. J 5, 1063 (1930) RP247.
Volumetric determination of pentoses and pentosans. J 8, 25 (1932) RP398.
- Kline, G. M., Azilrod, B. M., Study of transparent plastics for use on aircraft. J 19, 367 (1937) RP1031.

- Kline, G. M., Drake, N. L., Polymerization of olefins formed by the action of sulphuric acid on methylisopropylcarbinol. J 13, 705 (1934) RP740.
- Kline, G. M., Malmberg, C. G., Suitability of various plastics for use in airplane dopes. J 20, 651 (1938) RP1098.
- Kline, G. M., Meacham, M. R., Acree, S. F., On elimination of liquid potentials with potassium chloride and ammonium chloride. J 3, 101 (1932) RP403.
- Kline, G. M., Reinhart, F. W., Kronstadt, R. A., Antiscatter treatments for glass. M175 (1944).
- Kline, G. M., Reinhart, F. W., Rinker, R. C., De Lollis, N. J., Effect of catalysts and pH on strength of resin-bonded plywood. J 37, 281 (1946) RP1738.
- Klinefelter, T. A., Meyer, W. W., Substitution of domestic for imported clays in whiteware bodies. J 19, 65 (1937) RP1011.
- Klopsch, O. Z., French, H. J.: Initial temperature and mass effects in quenching. T 19, 589 (1924-25) T295.
- Some characteristics of quenching curves. T 20, 365 (1925-26) T313.
- Kluge, R. W., Tuma, E. C., Lapped bar splices in concrete beams. J 35, 187 (1945) RP1669.
- Knight, O. A., Rawdon, H. S., Comparative properties of wrought iron made by hand puddling and by the Aston process. J 3, 953 (1929) RP124.
- Knoop, F., Herschman, H. K., Influence of grinding treatments on the surface hardness of intaglio printing plates of 0.33-percent carbon steel. J 26, 261 (1941) RP1374.
- Knoop, F., Peters, C. G., Emerson, W. B., A sensitive pyramidal-diamond tool for indentation measurements. J 23, 39 (1939) RP1220.
- Knowles, H. B.: The use of α -benzoinoxime in the determination of molybdenum. J 9, 1 (1932) RP453.
- Use of 8-hydroxyquinoline in determinations of aluminum, beryllium, and magnesium. J 15, 87 (1935) RP813.
- Knowles, H. B., Lundell, G. E. F.: Use of 8-hydroxyquinoline in separations of aluminum. J 3, 91 (1929) RP86.
- A contribution to the chemistry of rhenium. J 18, 629 (1937) RP999.
- Knowlton, J. W., Rossini, F. D.: Calorimetric determination of the heats of combustion of ethylene and propylene. J 19, 249 (1937) RP1024.
- Heats of combustion and of formation of the normal olefin (alkene-1) hydrocarbons in the gaseous state. J 19, 339 (1937) RP1028.
- Method and apparatus for the rapid conversion of deuterium oxide into deuterium. J 19, 605 (1937) RP1050.
- Heats of combustion of tetramethylmethane and 2-methylbutane. J 22, 415 (1939) RP1193.
- Knowlton, J. W., Rossini, F. D., Johnston, H. L., Heat and free energy of formation of deuterium oxide. J 24, 369 (1940) RP1287.
- Kobayashi, F. F., Geiger, W. B., Harris, M., Chemically modified wools of enhanced stability. J 29, 381 (1942) RP1506.
- Koerner, E. A., Sigler, P. A.: Performance test of floor coverings for use in low-cost housing: Part 1. BMS34 (1940).
- Performance test of floor coverings for use in low-cost housing: Part 2. BMS43 (1940).
- Performance test of floor coverings for use in low-cost housing: Part 3. BMS63 (1941).
- Koerner, E. A., Sigler, P. A., Martens, R. I., Dimensional changes of floor coverings with changes in relative humidity and temperature. BMS85 (1942).
- Kohr, R. F., Condensation of water from engine exhaust for airship ballasting. T 19, 537 (1924-25) T293.
- Kolster, F. A., A direct-reading instrument for measuring the logarithmic decrement and wave length of electromagnetic waves. B 11, 421 (1915) S235.
- Kolster, F. A., Dunmore, F. W., The radio direction finder and its application to navigation. S 17, 529 (1922) S428.
- Kosting, P. R., Accelerated weathering tests of soldered and tinned sheet copper. J 8, 365 (1932) RP422.
- Kouwenhoven, W. B., Sanford, R. L., Location of flaws in rifle-barrel steel by magnetic analysis. S 15, 219 (1919-20) S343.
- Kremers, H. C., Kiess, C. C., Hopkins, B. S., Wave lengths longer than 5500 Å in the arc spectra of yttrium, lanthanum, and cerium and the preparation of pure rare earth elements. S 17, 317 (1922) S421.
- Kretschman, C. M., Carroll, B. H., Photographic reversal by desensitizing dyes. J 10, 449 (1933) RP541.
- Kretschman, C. M., Carroll, B. H., Hubbard, D., The photographic emulsion: Notes on stability of finished plates. J 12, 223 (1934) RP646.
- Krider, H. S., Hidnerl, P., Thermal expansion of columbium. J 11, 279 (1933) RP590.
- Kronstadt, R. A., Hobbs, R. B., Wearing quality of some vegetable-tanned sole leathers. J 34, 33 (1945) RP1626.
- Kronstadt, R. A., Kanagy, J. R., Iron as a tanning agent. J 31, 279 (1943) RP1566.
- Kronstadt, R. A., Reinhart, F. W., Kline, G. M., Antiscatter treatments for glass. M 175 (1944).
- Kruse, S., Dellinger, J. H., Whittemore, L. E., A study of radio signal fading. S 19, 193 (1923-24) S476.
- Krynitsky, A. I., Experiments on copper crusher cylinders. T 15, (1921) T185.
- Krynitsky, A. I., Gardner, H. B., Saeger, Jr., C. M., Properties of cast red brass as affected by the ambient atmosphere during melting. J 31, 125 (1943) RP1553.
- Krynitsky, A. I., Harrison, W. N., Blistering phenomena in the enameling of cast iron. J 4, 757 (1930) RP179.
- Krynitsky, A., Price, M., Fineness test of molding sand. J 36, 521 (1946) RP1720.
- Krynitsky, A. I., Rawdon, H. S., A study of the deterioration of nickel spark-plug electrodes in service. T 13, (1919-20) T143.
- Krynitsky, A. I., Saeger, Jr., C. M.: Effect of melting conditions on the running quality of aluminum cast in sand molds. J 13, 579 (1934) RP727.
- An improved method for preparing cast-iron transverse test bars. J 16, 367 (1936) RP880.
- Elastic properties of cast iron. J 22, 191 (1939) RP1176.
- Elastic properties of some alloy cast irons. J 28, 73 (1942) RP1447.

L

- Lampland, C. O., Coblenz, W. W., Further radiation measurements and temperature estimates of the planet Mars, 1926. S 22, 237 (1927-28) S553.
- Lang, R. J., Kiess, C. C., The structure of the spectra of doubly and trebly ionized zirconium. J 5, 305 (1930) RP202.
- Langdon, S. C., Rawdon, H. S., A peculiar type of intercrystalline brittleness of copper. T 13, (1919-20) T158.
- Langer, R. M., Meggers, W. F., Light scattering in liquids. J 4, 711 (1930) RP175.
- Lapham, E. G.: An improved audio-frequency generator. J 7, 691 (1931) RP367.
- A 200-kilocycle piezo oscillator. J 11, 59 (1933) RP576.
- Monitoring the standard radio-frequency emissions. J 14, 227 (1935) RP766.
- Harmonic method of intercomparing the oscillators of the National Standard of Radio Frequency. J 17, 491 (1936) RP925.
- Lapham, E. G., Diamond, H., Hinman, Jr., W. S., Dunmore, F. W., An improved radio sonde and its performance. J 25, 327 (1940) RP1329.
- Lapham, E. G., Diamond, H., Norton, K. A., On the accuracy of radio field-intensity measurement at broadcast frequencies. J 21, 795 (1938) RP1156.
- Lapham, E. G., Hall, E. L., Heaton, V. E., The national primary standard of radio frequency. J 14, 85 (1935) RP759.
- Lapham, E. G., Heaton, V. E., Quartz plate mountings and temperature control for piezo oscillators. J 7, 683 (1931) RP366.
- Larrabee, C. P., Bright, H. A., Determination of manganese in steel and iron by the persulphate-arsenite method. J 3, 573 (1929) RP109.

- Larson, L. J., Petrenko, S. N., Loading test of a hollow tile and reinforced concrete floor of Arlington Building, Washington, D. C. T 17, 405 (1922-24) T236.
- Larson, L. J., Templin, R. L., Load strain-gage test of 150-ton floating crane for the Bureau of Yards and Docks, U. S. Navy Department. T 13, (1919-20) T151.
- Laufer, M. K., Foskett, L. W., Daytime photoelectric measurement of cloud heights. J 26, 331 (1941) RP1379.
- Laun, D. D., Preliminary lists of terms for the arc and spark spectra of tungsten. J 21, 207 (1938) RP1125.
- Laun, D. D., Kiess, C. C., Humphreys, C. J., Preliminary description and analysis of the first spectrum of uranium. J 37, 57 (1946) RP1729.
- Launer, H. F.:
Simplified determination of resin in papers and pulps. J 18, 227 (1937) RP973.
Simplified volumetric determination of alpha, beta, and gamma cellulose in pulps and papers. J 18, 333 (1937) RP979.
Volumetric determination of alpha-beta-, and gamma-cellulose in pulps and in papers containing sizing, filler, and other materials. J 20, 87 (1938) RP1063.
Determination of the pH value of papers. J 22, 553 (1939) RP1205.
Retention of aluminum ion and hydrogen ion in papers. J 23, 663 (1939) RP1262.
Apparatus for the study of the photo-chemistry of sheet materials. J 24, 567 (1940) RP1300.
Reflection-transmission relationships in sheet materials. J 27, 429 (1941) RP1430.
- Launer, H. F., Wilson, W. K.:
Determination of pentosans in pulps and papers. J 22, 471 (1939) RP1199.
Photochemical stability of papers. J 30, 55 (1943) RP1517.
- Ledig, P. G., Weaver, E. R., Detector for water vapor in closed pipes. T 17, 637 (1922-24) T242.
- Lerch, W.:
Approximate glass content of commercial portland cement clinker. J 20, 77 (1938) RP1066.
Effect of glass content upon the heat of hydration of portland cement. J 21, 235 (1938) RP1127.
- Lerch, W., Ashton, F. W., Bogue, R. H., The sulpho-aluminates of calcium. J 2, 715 (1929) RP54.
- Lerch, W., Bogue, R. H., Heat of hydration of portland cement pastes. J 12, 645 (1934) RP684.
- Lerch, W., Brownmiller, L. T., Method for approximating the glass content of portland cement clinker. J 18, 609 (1937) RP997.
- Leslie, R. T.:
A laboratory apparatus for the continuous extraction of liquids by low boiling solvents. J 3, 591 (1932) RP439.
Purification of hydrocarbons by crystallization from liquid methane. Isolation of 2-methylheptane from petroleum. J 10, 609 (1933) RP552.
Critical solution temperatures of some hydrocarbons in sulphur dioxide. J 13, 589 (1934) RP728.
Separation of a dimethylcyclohexane fraction from a midcontinent petroleum. J 15, 41 (1935) RP808.
Hydrocarbons in the fraction of a midcontinent petroleum distilling between 115° and 124° C. J 17, 761 (1936) RP943.
Summary of an investigation of the composition of a midcontinent petroleum distillate, boiling between 100° and 130° C. J 22, 153 (1939) RP1174.
- Leslie, R. T., Bruun, J. H., Schickltanz, S. T., Determination of the toluene content of a midcontinent petroleum. J 6, 363 (1931) RP280.
- Leslie, R. T., Heuer, W. W.:
Study of the crystal behavior of hydrocarbons. J 18, 639 (1937) RP1000.
A continuous high-vacuum still and boiling-point apparatus, and the systematic distillation of a dewaxed lubricant fraction of petroleum. J 21, 515 (1938) RP1142.
- Leslie, R. T., Hoffman, J. I., Caul, H. J., Clark, L. J., Hoffman, J. D., Development of a hydrochloric acid process for the production of alumina from clay. J 37, 409 (1946) RP1756.
- Leslie, R. T., Schickltanz, S. T., Separation of normal octane from petroleum by distillation and crystallization. J 6, 377 (1931) RP282.
- Leslie, R. T., White, J. D., Present status of the isolation and identification of the volatile hydrocarbons in a midcontinent petroleum. J 15, 211 (1935) RP824.
- Lester, G. H., Norton, K. A., Kirby, S. S., An analysis of continuous records of field intensity at broadcast frequencies. J 13, 897 (1934) RP752.
- Levy, S., Ramberg, W., Calculation of stresses and natural frequencies for a rotating propeller blade vibrating flexurally. J 21, 639 (1938) RP1148.
- Lewis, A. B.:
A clock-controlled constant-frequency generator. J 8, 141 (1932) RP406.
Calculations of electrical surge-generator circuits. J 17, 585 (1936) RP929.
- Lewis, A. B., Brooks, H. B., Improved continuously variable self and mutual inductor. J 19, 493 (1937) RP1040.
- Lewis, A. B., Hall, E. L., Caldwell, F. R., Some electrical properties of foreign and domestic micas, and the effect of elevated temperatures on micas. J 7, 403 (1931) RP347.
- Lewis, A. B., Park, J. H., Standard electrodynamic wattmeter and ac-dc transfer instrument. J 25, 545 (1940) RP1344.
- Lewis, W. S.:
Physical testing of cotton yarns. T 2, (1912-14) T19.
Difference in weight between raw and clean wools. T 6, (1915-16) T57.
Comparative tests of stitches and seams. T 9, (1916-17) T96.
- Lewis, W. S., Cleary, C. J., Standardization of automobile-tire fabric testing. T 7, (1916-17) T68.
- Liddel, U., Kasper, C., Spectral differentiation of pure hydrocarbons: A near infrared absorption study. J 11, 599 (1933) RP610.
- Lindlief, W. E., and others, Mechanical properties of metals and alloys. C447 (1943).
- Lindvall, P. W., Manon, G. G., De Lollis, N. J., Acree, S. F., Effect of sodium chloride on the apparent ionization constant of boric acid and the pH values of borate solutions. J 36, 543 (1946) RP1721.
- Liscomb, F. J., Blum, W., Carson, C. M., Zinc cyanide plating solutions. T 15, (1921) T195.
- Lloyd, D. B., Tool, A. Q., Merritt, G. E., Dimensional changes caused in glass by heating cycles. J 5, 627 (1930) RP219.
- Lloyd, M. G.:
The effect of wave form upon the iron losses in transformers. B 4, 477 (1907-08) S88.
Function of a periodic variable given by the steady reading of an instrument; with a note on the use of the capillary electrometer with alternating voltages. B 4, 525 (1907-08) S90.
Dependence of magnetic hysteresis upon the wave form. B 5, 381 (1908-09) S106.
Errors in magnetic testing with ring specimens. B 5, 435 (1908-09) S108.
- Lloyd, M. G., Agnew, P. G.:
Effect of phase of harmonics upon acoustic quality. B 6, 255 (1909-10) S127.
The regulation of potential transformers, and the magnetizing current. B 6, 273 (1909-10) S129.
- Lloyd, M. G., Fisher, J. V. S.:
An apparatus for determining the wave form of magnetic flux. B 4, 467 (1907-08) S87.
The testing of transformer steel. B 5, 453 (1908-09) S109.
- Lloyd, M. G., Rosa, E. B., The determination of the ratio of transformation and of the phase relations in transformers. B 6, 1 (1909-10) S116.
- Lloyd, M. G., Rosa, E. B., Reid, C. E., Influence of wave form on the rate of integrating induction wattmeters. B 1, 421 (1903-05) S21.
- Lofton, R. E.:
Photomicrography of paper fibers. T 16, 629 (1921-22) T217.
A measure of the color characteristics of white papers. T 17, 667 (1922-24) T244.
Study of the windows of window envelopes for the purpose of developing standard specifications. T 21, 385 (1926-27) T343.

- Lofton, R. E., Merritt, M. F.*, Method for differentiating and estimating unbleached sulphite and sulphate pulps in paper. T 15, (1921) T189.
- Logan, H. L.*:
Electrode potential measurements as a means of studying the corrosion characteristics of wrought aluminum alloys of the duralumin type. J 25, 315 (1940) RP1328.
Effect of the quenching rate on susceptibility to intercrystalline corrosion of heat-treated 24S aluminum alloy sheet. J 26, 321 (1941) RP1378.
- Logan, H. L., Hession, H.*, Effect of artificial aging on the tensile properties and resistance to corrosion of the 24S-T aluminum alloy. J 33, 465 (1947) RP1788.
- Logan, K. H.*:
Soil-corrosion studies, 1927-28. J 3, 275 (1929) RP95.
Soil-corrosion studies: Nonferrous metals and alloys, metallic coatings, and specially prepared ferrous pipes removed in 1930. J 7, 585 (1931) RP359.
Soil-corrosion studies, 1934. Rate of loss of weight and pitting of ferrous specimens. J 16, 431 (1936) RP883.
Soil-corrosion studies, 1934. Rates of loss of weight and penetration of nonferrous materials. J 17, 781 (1936) RP945.
Soil-corrosion studies, 1934. Bituminous coatings for underground service. J 19, 695 (1937) RP1058.
Engineering significance of National Bureau of Standards soil-corrosion data. J 22, 109 (1939) RP1171.
Soil-corrosion studies, 1937. Corrosion-resistant materials and special tests. J 23, 515 (1939) RP1250.
Soil-corrosion studies 1939. Coatings for the protection of metals underground. J 28, 57 (1942) RP1446.
Soil-corrosion studies 1939: Ferrous and nonferrous corrosion-resistant materials. J 28, 379 (1942) RP1460.
Underground corrosion. C450 (1945).
- Logan, K. H., Ewing, S. P.*, Soil-corrosion studies, 1934. Field tests of nonbituminous coatings for underground use. J 18, 361 (1937) RP982.
- Logan, K. H., Ewing, S. P., Yeomans, C. D.*, Bureau of Standards soil-corrosion studies. I. Soils, materials, and results of early observations. T 22, 447 (1927-28) T368.
- Logan, K. H., Grodsky, V. A.*, Soil-corrosion studies, 1930. Rates of corrosion and pitting of bare ferrous specimens. J 7, 1 (1931) RP329.
- Logan, K. H., McCollum, B.*:
Electrolytic corrosion of iron in soils. T 3, (1911-16) T25.
Earth resistance and its relation to electrolysis of underground structures. T 3, (1911-16) T26.
Special studies in electrolysis mitigation. IV. A preliminary report on electrolysis mitigation in Elyria, Ohio, with recommendations for mitigation. T 6, (1915-16) T55.
Leakage of currents from electric railways. T 7, (1916-17) T63.
Practical applications of the earth-current meter. T 21, 683 (1926-27) T351.
Electrolysis testing. T 22, 15 (1927-28) T355.
- Logan, K. H., Romanoff, M.*, Soil-corrosion studies, 1941: Ferrous and nonferrous corrosion-resistant materials and nonbituminous coatings. J 33, 145 (1944) RP1602.
- Logan, K. H., Rosa, E. B., McCollum, B.*, Electrolysis from electric railway currents and its prevention: Experimental test on a system of insulated negative feeders in St. Louis. T 4, (1912-14) T32.
- Logan, K. H., Taylor, R. H.*, Soil corrosion studies, 1932. Rates of loss of weight and pitting of ferrous and non-ferrous specimens and metallic protective coatings. J 12, 119 (1934) RP638.
- London, A.*, Methods for determining sound transmission loss in the field. J 26, 419 (1941) RP1388.
- Long, M. B., Coblenz, W. W., Emerson, W. B.*, Spectroradiometric investigation of the transmission of various substances. B 14, 653 (1918-19) S325.
- Long, M. B., Coblenz, W. W., Kahler, H.*, The decrease in ultra-violet and total radiation with usage of quartz mercury vapor lamps. S 15, 1 (1919-20) S330.
- Long, M. B., Edwards, J. D.*, Effect of solar radiation upon balloons. T 12, (1919) T128.
- Loomis, G. A.*, Porosity and volume changes of clay fire bricks at furnace temperatures. T 13, (1919-20) T159.
- Lord, A. R., Slater, W. A., Zipprodt, R. P.*, Shear tests of reinforced concrete beams. T 20, 387 (1925-26) T314.
- Lorentz, M. G., et al.*, Light metals and alloys — aluminum, magnesium. C346 (1927).
- Lorentz, M. G., Rawdon, H. S.*:
Metallographic etching reagents: I, for copper. S 16, 641 (1920) S399.
Metallographic etching reagents: II. For copper alloys, nickel, and the alpha alloys of nickel. S 17, 635 (1922) S435.
- Lorentz, M. G., Walkup, H. H.*, Zinc and its alloys. C395 (1931).
- Losse, L. H., Humphrey, R. L.*, The strength of reinforced concrete beams — results of tests of 333 beams (First series). T 1, (1910-12) T2.
- Lowell, P. D.*:
Radio-frequency amplifiers. S 18, 335 (1922-23) S449.
An electron-tube amplifier using sixty-cycle alternating current to supply power for the filaments and plates. S 18, 345 (1922-23) S450.
- Lowry, T. M.*, The optical rotation of liquids, its variation with wave length, temperature, solvent, and concentration. M118 (1932).
- Lundell, G. E. F., Bright, H. A.*, Determination of carbon in high sulphur steels by direct combustion. J 5, 943 (1930) RP240.
- Lundell, G. E. F., Hoffman, J. I.*:
Analysis of bauxite and of refractories of high alumina content. J 1, 91 (1928) RP5.
The analysis of fluorspar. J 2, 671 (1929) RP51.
Determination of fluorine and of silica in glasses and enamels containing fluorine. J 3, 581 (1929) RP110.
The effect of light on silver chloride in chemical analyses. J 4, 109 (1930) RP134.
The precipitation and ignition of magnesium ammonium phosphate. J 5, 279 (1930) RP200.
Atomic weight of gallium. J 15, 409 (1935) RP838.
Redetermination of the atomic weight of aluminum. J 18, 1 (1937) RP957.
Determination of phosphoric anhydride in phosphate rock, superphosphate, and "metaphosphate." J 19, 59 (1937) RP1010.
Analysis of phosphate rock. J 20, 607 (1938) RP1095.
Volatilization of metallic compounds from solutions in perchloric or sulfuric acid. J 22, 465 (1939) RP1198.
Separation and colorimetric determination of rhenium and molybdenum. J 23, 497 (1939) RP1248.
- Lundell, G. E. F., Knowles, H. B.*:
Use of 8-hydroxyquinoline in separations of aluminum. J 3, 91 (1929) RP86.
A contribution to the chemistry of rhenium. J 13, 629 (1937) RP999.
- Lundell, G. E. F., Scherrer, J. A.*, The importance of particle size in samples of certain metallurgical materials. J 5, 891 (1930) RP237.
- Lux, G. A., Blum, W.*, Methods of polishing steel and their effects upon the protective value of electroplated coatings. J 34, 295 (1945) RP1645.
- Luxford, R. F., Easton, A. H., Peck, M. F.*, Structural properties of "Precision-Built, Jr." prefabricated wood-frame wall construction sponsored by the Homasote Co. BMS72 (1941).
- Luxford, R. F., Whittemore, H. L., Phelan, V. B., Dill, R. S.*, Structural and heat-transfer properties of "Multiple Box-Girder Plywood Panels" for walls, floors, and roofs sponsored by Loren H. Wittner. BMS99 (1943).
- Lyon, W. C., Whittemore, H. L., Stang, A. H., Sweetman, L. R.*, Strain measurement in the reinforcement for the dome of the Natural History Building. J 6, 183 (1931) RP268.

- Mack, P. B., Schiefer, H. F., Stevens, H. T., Boyland, P. M., A study of the properties of household blankets. *J* 32, 261 (1944) RP1589.
- Maclean, M. E., Jencks, P. J., Acree, S. F., Comparison of the purity of samples of organic solvents by ultraviolet spectrophotometry. *J* 34, 271 (1945) RP1643.
- Maczkowske, E. E., A rapid method for the determination of silica in portland cement. *J* 16, 549 (1936) RP891.
- Madorsky, S. L., Brewer, A. K., Concentration of the isotopes of mercury by free evaporation in a 10-cell counter-current reflux still. *J* 38, 129 (1947) RP1764.
- Madorsky, S. L., Brewer, A. K., Taylor, J. K., Dibeler, V. H., Bradt, P., Parkam, O. L., Britten, R. J., Reid, Jr., J. G., Concentration of isotopes of potassium by the counter-current electromigration method. *J* 38, 137 (1947) RP1765.
- Madorsky, S. L., Straus, S., Concentration of isotopes of chlorine by the counter-current electromigration method. *J* 38, 185, (1947) RP1767.
- Mair, B. J.:
The synthesis, purification, and certain physical constants of the normal hydrocarbons from pentane to dodecane of *n*-amyl bromide and *n*-nonyl bromide. *J* 9, 457 (1932) RP482.
An accurate ebullioscopic method for determining the molecular weights of nonvolatile petroleum fractions. *J* 14, 345 (1935) RP772.
Separation and determination of aromatic and monoolefin hydrocarbons in mixtures with paraffins and naphthenes by adsorption. *J* 34, 435 (1945) RP1652.
- Mair, B. J., Forziati, A. F.:
Analytical determination of aromatic hydrocarbons by adsorption. *J* 32, 151 (1944) RP1582.
Separation and recovery of aromatic hydrocarbons from paraffins and naphthenes by adsorption. *J* 32, 165 (1944) RP1583.
- Mair, B. J., Forziati, A. F., Willingham, C. B., Rossini, F. D., Hydrocarbons in the gasoline fraction of seven representative crudes, including all the distillate to 102° C and the aromatics to 160° C. *J* 32, 11 (1944) RP1571.
- Mair, B. J., Forziati, A. F., Rossini, F. D., Assembly and calibration of a density balance for liquid hydrocarbons. *J* 35, 513 (1945) RP1685.
- Mair, B. J., Glasgow, Jr., A. R., Rossini, F. D.:
Determination of freezing points and amounts of impurity in hydrocarbons from freezing and melting curves. *J* 26, 591 (1941) RP1397.
Separation of hydrocarbons by azeotropic distillation. *J* 27, 39 (1941) RP1402.
- Mair, B. J., Schickltanz, S. T.:
The isolation of mesitylene, pseudocumene, and hemimellitene from an Oklahoma petroleum. *J* 11, 665 (1933) RP614.
Extraction, with acetone, of substantially constant-boiling fractions of a "water-white" lubricating oil. *J* 17, 909 (1936) RP953.
- Mair, B. J., Schickltanz, S. T., Rose, Jr., F. W., Apparatus and methods for investigating the chemical constitution of lubricating oil, and preliminary fractionation of the lubricating-oil fraction of a midcontinent petroleum. *J* 15, 557 (1935) RP849.
- Mair, B. J., Streiff, A. J.:
Separation of the aromatic hydrocarbons, and the isolation of *n*-dodecane, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene, from the kerosene fraction of petroleum. *J* 24, 395 (1940) RP1289.
Isolation of 1,2,3,4-tetramethylbenzene, 5,6,7,8-tetrahydronaphthalene, 1-methyl-5,6,7,8-tetrahydronaphthalene, and 2-methyl-5,6,7,8-tetrahydronaphthalene from petroleum. *J* 27, 343 (1941) RP1423.
- Mair, B. J., Termini, D. J., Willingham, C. B., Rossini, F. D., Purification and sealing "in vacuum" of National Bureau of Standards Samples of hydrocarbons. *J* 37, 229 (1946) RP1744.
- Mair, B. J., White, J. D., Separation of petroleum hydrocarbons with silica gel. *J* 15, 51 (1935) RP809.
- Mair, B. J., Willingham, C. B.:
Relationships between physical properties and chemical constitution of lubricating oil fractions. *J* 17, 923 (1936) RP954.
Exhaustive fractionation of the "extract" portion of the lubricant fraction from a midcontinent petroleum. *J* 21, 535 (1938) RP1143.
Efficiency of a rotary distillation column. *J* 22, 519 (1939) RP1201.
- Mair, B. J., Willingham, C. B., Streiff, A. J.:
Hydrogenation of the "extract" portion of the lubricant fraction from a midcontinent petroleum. *J* 21, 565 (1938) RP1144.
Chemical constitution of the "extract" portion of the lubricant fraction from a midcontinent petroleum. *J* 21, 581 (1938) RP1145.
- Mallett, M. W., Thompson, J. G., Preparation of crucibles from special refractories by slip-casting. *J* 23, 319 (1939) RP1236.
- Malmberg, C. G., Kline, G. M., Suitability of various plastics for use in airplane dopes. *J* 20, 651 (1938) RP1098.
- Malmberg, C. G., Nicholas, W. W., Registration of cathode rays by thin films of metals and metal compounds. *J* 8, 61 (1932) RP400.
- Manov, G. G., Bates, R. G., Hamer, W. J., Acree, S. F., Provisional pH values for certain standard buffer solutions. *J* 29, 183 (1942) RP1495.
- Manov, G. G., De Lollis, N. J., Acree, S. F.:
Liquid-junction potentials, and relative activity coefficients of chloride ions, in concentrated mixed chlorides and nitrates at 25° C. *J* 33, 273, (1944) RP1608.
Ionization constant of boric acid and the pH of certain boraxchloride buffer solutions from 0° to 60° C. *J* 33, 287 (1944) RP1609.
Comparative liquid-junction potentials of some pH buffer standards and the calibration of pH meters. *J* 34, 115 (1945) RP1632.
- Manov, G. G., De Lollis, N. J., Lindvall, P. W., Acree, S. F., Effect of sodium chloride on the apparent ionization constant of boric acid and the pH values of borate solutions. *J* 36, 543 (1946) RP1721.
- Mark, H., Sookne, A. M., Rutherford, H. A., Harris, M., Fractionation of cellulose acetate. *J* 29, 123 (1942) RP1490.
- Marshall, L. H., Embrittlement of malleable cast iron resulting from heat treatment. *T* 17, 677 (1922-24) T245.
- Marshall, L. H., Sanford, R. L., The magnetic susceptibility and iron content of cast red brass. *T* 17, 1 (1922-24) T221.
- Martens, R. I., Sigler, P. A., Properties of adhesives for floor coverings. BMS59 (1940).
- Martens, R. I., Sigler, P. A., Koerner, E. A., Dimensional changes of floor coverings with changes in relative humidity and temperature. BMS85 (1942).
- Martin, A. D., Mickey, L., Development of standard-frequency transmitting sets. *J* 12, 1 (1934) RP630.
- Martin, A. R., Rutherford, H. A., Minor, F. W., Harris, M., Oxidation of cellulose: The reaction of cellulose with periodic acid. *J* 29, 131 (1942) RP1491.
- Martin, A. R., Smith, L., Whistler, R. L., Harris, M., Estimation of aldehyde groups in hydrocellulose from cotton. *J* 27, 449 (1941) RP1432.
- Martin, A. R., Whistler, R. L., Conrad, C. M., Pectic substance of cotton fibers in relation to growth. *J* 25, 305 (1940) RP1326.
- Martin, A. R., Whistler, R. L., Harris, M.:
Determination of uronic acids in cellulosic materials. *J* 24, 13 (1940) RP1268.
Pectic substance in cotton and its relation to the properties of the fiber. *J* 24, 555 (1940) RP1299.
- Maryott, A. A., Conductimetric titrations of acids and bases in benzene and dioxane. *J* 38, 527 (1947) RP1794.
- Maryott, A. A., Acree, S. F.:
Dipole moment and structure of trioxane. *J* 33, 71 (1944) RP1596.
Dipole moments and resonance of some benzein indicators and related compounds. *J* 38, 505 (1947) RP1791.
- Mason, M. A., Schubauer, G. B., Performance characteristics of a water current meter in water and in air. *J* 18, 351 (1937) RP981.

- Massengale, G. B., Heindl, R. A., Cossette, L. G.*, Slip casting of clay pots for the manufacture of optical glass at the National Bureau of Standards. C452 (1946).
- Matheson, H., Bekkedahl, N.*, Heat capacity, entropy, and free energy of rubber hydrocarbon. J 15, 503 (1935) RP844.
- Matheson, H., Burton, J. O., Acree, S. F.*, A glass electrode potentiometer system for the determination of the pH values of weakly buffered solutions such as natural and treated waters. J 12, 67 (1934) RP634.
- Matheson, H., Isbell, H. S., Smith, E. R.*, Application of the dropping-mercury electrode to the investigation of the polyhydroxy acids and lactones. J 28, 95 (1942) RP1448.
- Matheson, H., Smith, E. R.*:
Difference in atomic weight of oxygen from air and from water. J 17, 625 (1936) RP932.
Boiling points of benzene, ethylene chloride, *n*-heptane, and 2,2,4-tri-methylpentane over the range 660- to 860-mm pressure. J 20, 641 (1938) RP1097.
- Mathews, J. A., Jackson, R. F.*:
Some physical properties of levulose and its estimation by copper reduction methods. J 8, 403 (1932) RP426.
The stability of levulose in aqueous solutions of varying pH. J 11, 619 (1933) RP611.
Yield and purity of levulose derived from the calcium levulate process. J 15, 341 (1935) RP832.
- Mathews, J. A., Jackson, R. F., Chase, W. D.*, Analytical methods for the determination of levulose in crude products. J 9, 597 (1932) RP495.
- Mathewson, W. E., Gibson, K. S., McNicholas, H. J., Tyndall, E. P. T., Frehafer, M. K.*, The spectral transmissive properties of dyes: I. Seven permitted food dyes, in the visible, ultra-violet, and near infra-red. S 18, 121 (1922-23) S440.
- Mathusa, J. L.*, Supplemental list of publications of the National Bureau of Standards, January 1, 1942, to June 30, 1944. (1944).
- Maupin, A. R., Swanger, W. H.*:
Structural changes in the bonding layer of soft-soldered joints in copper pipe lines on long-continued heating. J 28, 479 (1942) RP1465.
Strength of soft-soldered joints in copper tubing. BMS58 (1940).
Strength of sleeve joints in copper tubing made with various lead-base solders. BMS83 (1942).
- Maxwell, L. C., Cain, J. R.*, Electrolytic resistance method for determining carbon in steel. T 12, (1919) T141.
- McAdam, Jr., D. J., Bennett, J. A.*, Creep rates of cold-drawn nickel-copper alloy (monel metal). J 28, 417 (1942) RP1462.
- McAdam, Jr., D. J., Clyne, R. W.*, Influence of chemically and mechanically formed notches on fatigue of metals. J 13, 527 (1934) RP725.
- McAdam, Jr., D. J., Geil, G. W.*:
Rate of oxidation of steels as determined from interference colors of oxide films. J 23, 63 (1939) RP1221.
Influence of cyclic stress on corrosion pitting of steels in fresh water, and influence of stress corrosion on fatigue limit. J 24, 685 (1940) RP1307.
Influence of stress on the corrosion pitting of aluminum bronze and monel metal in water. J 26, 135 (1941) RP1366.
- McAdam, Jr., D. J., Geil, G. W.*, Rate of oxidation of typical nonferrous metals as determined by interference colors of oxide films. J 28, 593 (1942) RP1470.
- McAdam, Jr., D. J., Mebs, R. W.*, Tensile elastic properties of nickel, copper, open-hearth iron, and typical steels. J 28, 311 (1942) RP1459.
- McAllister, A. S., et al.*, National directory of commodity specifications: Classified and alphabetical lists and brief descriptions of existing commodity specifications. M65 (1925).
- McBride, R. S.*, Standardization of potassium permanganate solution by sodium oxalate. B 8, 611 (1912) S182.
- McBride, R. S., Berry, W. M.*, Tests of flexible gas tubing. T 12, (1919) T133.
- McBride, R. S., Brumbaugh, I. V.*, Experimental-retort tests of Orient coal. T 12, (1919) T134.
- McBride, R. S., Dunkley, W. A., Crittenden, E. C., Taylor, A. H.*, The influence of quality of gas and other factors upon the efficiency of gas-mantle lamps. T 11, (1918-19) T110.
- McBride, R. S., Edwards, J. D.*, Lead acetate test for hydrogen sulphide in gas. T 4, (1913-14) T41.
- McBride, R. S., Reinicker, C. E.*, Gas-mantle lighting conditions in ten large cities in the United States. T 9, (1916-17) T99.
- McBride, R. S., Reinicker, C. E., Dunkley, W. A.*, Toluol recovery. T 11, (1918-19) T117.
- McBride, R. S., Rosa, E. B.*, Legal specifications for illuminating gas. T 2, (1912-14) T14.
- McBride, R. S., Selvig, W. A.*, Coking of Illinois coal in Koppers type oven. T 12, (1919) T137.
- McBride, R. S., Weaver, E. R.*, Determination of sulphur in illuminating gas. T 3, (1911-16) T20.
- McBurney, J. W.*, The compressive and transverse strength of brick. J 2, 821 (1929) RP59.
- McBurney, J. W., Eberle, A. R.*, Strength, water absorption, and resistance to freezing and thawing of sand-lime brick. J 20, 67 (1938) RP1065.
- McBurney, J. W., Harris, A. L., Stang, A. H.*, Compressive strength of steel columns incased in brick walls. J 10, 123 (1933) RP520.
- McBurney, J. W., Parsons, D. E.*, Wick test for efflorescence of building brick. J 19, 105 (1937) RP1015.
- McBurney, J. W., Parsons, D. E., Stang, A. H.*, Shear tests of reinforced brick masonry beams. J 9, 749 (1932) RP504.
- McBurney, J. W., Richmond, J. C.*, Strength, absorption and resistance to laboratory freezing and thawing of building bricks produced in the United States. BMS60 (1940).
- McBurney, J. W., Stang, A. H., Parsons, D. E.*, Compressive strength of clay brick walls. J 3, 507 (1929) RP108.
- McCollum, B.*, A new method for the absolute measurement of electric quantity. B 6, 503 (1909-10) S139.
- McCollum, B., Ahlborn, G. H.*:
Methods of making electrolysis surveys. T 3, (1911-16) T28.
Special studies in electrolysis mitigation. III. A report on conditions in Springfield, Ohio, with insulated feeder system installed. T 6, (1915-16) T54.
Influence of frequency of alternating or infrequently reversed current on electrolytic corrosion. T 7, (1916-17) T72.
- McCollum, B., Logan, K. H.*:
Electrolytic corrosion of iron in soils. T 3, (1911-16) T25.
Earth resistance and its relation to electrolysis of underground structures. T 3, (1911-16) T26.
Special studies in electrolysis mitigation. IV. A preliminary report on electrolysis mitigation in Elyria, Ohio, with recommendations for mitigation. T 6, (1915-16) T55.
Leakage of currents from electric railways. T 7, (1916-17) T63.
Practical applications of the earth-current meter. T 21, 683 (1926-27) T351.
Electrolysis testing. T 22, 15 (1927-28) T355.
- McCollum, B., Peters, O. S.*:
Surface insulation of pipes as a means of preventing electrolysis. T 2, (1912-14) T15.
A new electrical telemeter. T 17, 737 (1922-24) T247.
- McCollum, B., Rosa, E. B.*:
Special studies in electrolysis mitigation. I. A preliminary study of conditions in Springfield, Ohio, with recommendations for mitigation and control. T 3, (1911-16) T27.
Electrolysis and its mitigation. T 5, (1914-15) T52.
- McCollum, B., Rosa, E. B., Brooks, H. B., Canada, W. J., Glading, F. W.*, Investigation of cartridge-inclosed fuses. T 8, (1916-17) T74.
- McCollum, B., Rosa, E. B., Logan, K. H.*, Electrolysis from electric railway currents and its prevention: experimental test on a system of insulated negative feeders in St. Louis. T 4, (1913-14) T32.
- McCollum, B., Rosa, E. B., Peters, O. S.*, Electrolysis in concrete. T 2, (1912-14) T18.
- McCormac, W. T., Smith, R. W.*, Index to the reports of the National Conference on Weights and Measures. (1905-41). M172. (1942).

- McCrae, J. V., Dowdell, R. L., Preliminary studies of the effect of deoxidation and mold conditions on the tensile properties of carbon steel castings. *J* 5, 265 (1930) RP199.
- McCrae, J. V., Dowdell, R. L., Jordan, L., A study of the so-called "over-reduced" condition in molten steel. *J* 5, 1123 (1930) RP250.
- McCrorry, S. H., Wig, R. J., Williams, G. M., Bebb, E. C., Ferguson, L. R., Investigation of the durability of cement drain tile in alkali soils. *T* 5, (1914-15) T44.
- McCrorry, S. H., Wig, R. J., Williams, G. M., Finn, A. N., Bebb, E. C., Ferguson, L. R., Durability of cement drain tile and concrete in alkali soils. *T* 9, (1916-17) T95.
- McDaniel, A. B., Stang, A. H., Parsons, D. E., Strength of interlocking-rib tile walls. *T* 22, 389 (1927-28) T366.
- McDaniel, A. S., Rosa, E. B., Vinal, G. W.:
The silver voltameter — Part II. The chemistry of the filter-paper voltameter and the explanation of striations. *B* 9, 209 (1913) S195.
The silver voltameter — Part III. Second series of quantitative experiments and the preparation and testing of silver nitrate. *B* 9, 493 (1913) S201.
The silver voltameter — Part IV. Third series of quantitative experiments and special investigations. *B* 10, 475 (1914) S220.
- McDonald, E., Jackson, R. F.:
The constant occurrence of nonreducing disaccharides in hydrolyzed inulin. *J* 5, 1151, (1930) RP251.
Two new crystalline difructose anhydrides from hydrolyzed inulin. *J* 6, 709 (1931) RP299.
Structure of difructose anhydride III (difructofuranose 1,2', 2,3'-anhydride). *J* 24, 181 (1940) RP1277.
Errors of Munson and Walker's reducing-sugar tables and the precision of their method. *J* 27, 237 (1941) RP1417.
Copper reduction of dextrose, levulose, invert sugar and sucrose-invert-sugar mixtures in citrate-carbonate solution. *J* 34, 213 (1945) RP1638.
Reaction of periodic acid on the difructose anhydrides. *J* 35, 497 (1945) RP1683.
- McDonald, E. J., Turcotte, A. L.:
Study of Officer's method for the determination of invert sugar. *J* 37, 429 (1946) RP1757.
Structure of difructose anhydride II. *J* 38, 423 (1947) RP1784.
- McGowan, F. R., Schoffstall, C. W., Tentative standard test methods and percentages of oil and moisture in hair press cloths. *T* 17, 257 (1922-24) T231.
- McGowan, F. R., Schoffstall, C. W., Mercier, A. A.:
A study of silk waste used for cartridge-bag cloth, with an appendix on the general classification of waste silk. *T* 18, 567 (1924-25) T268.
Comparative wearing qualities of pima and ordinary cotton used in mail bags. *T* 19, 73 (1924-25) T277.
Effect of twist on the physical properties of a number 7s yarn. *T* 19, 85 (1924-25) T278.
- McGowan, F. R., Smither, F. W., Schoffstall, C. W., Performance tests of a liquid laundry soap used with textile materials. *T* 19, 1 (1924-25) T273.
- McKee, S. A.:
Journal-bearing design as related to maximum loads, speeds, and operating temperatures. *J* 19, 457 (1937) RP1037.
Friction and temperature as criteria for safe operation of journal bearings. *J* 24, 491 (1940) RP1295.
- McKelvy, E. C., Cragoe, C. S., O'Connor, G. F., Specific volume of saturated ammonia vapor. *S* 18, 707 (1922-23) S467.
- McKelvy, E. C., Isaacs, A., Causes and prevention of the formation of noncondensable gases in ammonia absorption refrigeration machines. *T* 14, (1920-21) T180.
- McKelvy, E. C., Osborne, N. S., Bearce, H. W., Density and thermal expansion of ethyl alcohol and of its mixtures with water. *B* 9, 327 (1913) S197.
- McKelvy, E. C., Shoemaker, M. P., The two common failures of the Clark standard cell. *S* 16, 409 (1920) S390.
- McKelvy, E. C., Taylor, C. S., Composition, purification, and certain constants of ammonia. *S* 18, 655 (1922-23) S465.
- McMurdie, H. F.:
Studies on a portion of the system: $\text{CaO-Al}_2\text{O}_3\text{-Fe}_2\text{O}_3$. *J* 18, 475 (1937) RP987.
X-ray studies of compounds in the system $\text{PbO-B}_2\text{O}_3$ and $\text{K}_2\text{O-PbO-SiO}_2$. *J* 26, 489 (1941) RP1392.
Structure of tricalcium aluminate. *J* 27, 499 (1941) RP1437.
- McMurdie, H. F., Bunting, E. N., X-ray studies of compounds in the system PbO-SiO_2 . *J* 23, 543 (1939) RP1251.
- McMurdie, H. F., Flint, E. P., X-ray patterns of hydrated calcium silicates. *J* 31, 225 (1943) RP1560.
- McMurdie, H. F., Flint, E. P., Wells, L. S.:
Formation of hydrated calcium silicates at elevated temperatures and pressures. *J* 21, 617 (1938) RP1147.
Hydrothermal and X-ray studies of the garnet-hydrogarnet series and the relationship of the series to hydration products of portland cement. *J* 26, 13 (1941) RP1355.
- McMurdie, H. F., Hock, C. W., Structure of the wool fiber as revealed by the electron microscope. *J* 31, 229 (1943) RP1561.
- McMurdie, H. F., Insley, H.:
Studies on the quaternary system $\text{CaO-MgO-2CaO.SiO}_2\text{-5CaO.3Al}_2\text{O}_3$. *J* 16, 467 (1936) RP884.
Minor constituents in portland cement clinker. *J* 20, 173 (1938) RP1074.
- McMurdie, H. F., Valkenburg, Jr., A. V., High-temperature X-ray diffraction apparatus. *J* 38, 415 (1947) RP1782.
- McMurdie, H. F., Wells, L. S., Clarke, W. F., Study of the system $\text{CaO-Al}_2\text{O}_3\text{-H}_2\text{O}$ at temperatures of 21° and 90° C. *J* 30, 367 (1943) RP1539.
- McNicholas, H. J.:
Absolute methods in reflectometry. *J* 1, 29 (1928) RP3.
Equipment for routine spectral transmission and reflection measurements. *J* 1, 793 (1928) RP30.
Use of the under-water spark with the Hilger sector photometer in ultra-violet spectrophotometry. *J* 1, 939 (1928) RP33.
The visible and ultra-violet absorption spectra of carotin and xanthophyll and the changes accompanying oxidation. *J* 7, 171 (1931) RP337.
Equipment for measuring the reflective and transmissive properties of diffusing media. *J* 13, 211 (1934) RP704.
Color and spectral transmittance of vegetable oils. *J* 15, 99 (1935) RP815.
Selection of colors for signal lights. *J* 17, 955 (1936) RP956.
- McNicholas, H. J., Curtis, H. J., Measurement of fiber diameters by the diffraction method. *J* 6, 717 (1931) RP300.
- McNicholas, H. J., Gibson, K. S., The ultra-violet and visible transmission of eye-protective glasses. *T* 11, (1918-19) T119.
- McNicholas, H. J., Gibson, K. S., Tyndall, E. P. T., The ultra-violet and visible transmission of various colored glasses. *T* 13, (1919-20) T148.
- McNicholas, H. J., Gibson, K. S., Tyndall, E. P. T., Frehafer, M. K., Mathewson, W. E., The spectral transmissive properties of dyes: I. Seven permitted food dyes, in the visible, ultra-violet, and near infra-red. *S* 18, 121 (1922-23) S440.
- McNicholas, H. J., Priest, I. G., Gibson, K. S., An examination of the Munsell color system. I. Spectral and total reflection and the Munsell scale of value. *T* 13, (1919-20) T167.
- McNicholas, H. J., Priest, I. G., Meggers, W. F., Gibson, K. S., Tyndall, E. P. T., The color and spectral composition of certain high-intensity searchlight arcs. *T* 13, (1919-20) T168.
- McPherson, A. T.:
Density and electrical properties of the system, rubber-sulphur: Part I. Density of rubber-sulphur compounds. *S* 22, 383 (1927-28) S560.
A method for the purification of rubber and properties of the purified rubber. *J* 8, 751 (1932) RP449.
Reclaimed rubber. *C* 393 (1931).

- McPherson, A. T., Bekkedahl, N., Heats of reaction of the system: rubber-sulphur. *J 14*, 601 (1935) RP791.
- McPherson, A. T., Cummings, A. D., Refractive index of rubber. *J 14*, 553 (1935) RP786.
- McPherson, A. T., Curtis, H. L., Dielectric constant, power factor, and resistivity of rubber and gutta-percha. *T 19*, 669 (1924-25) T299.
- McPherson, A. T., Curtis, H. L., Scott, A. H., Density and electrical properties of the system, rubber-sulphur: Part II. Electrical properties of rubber-sulphur compounds. *S 22*, 383 (1927-28) S560.
- McPherson, A. T., Holt, W. L.: Change of volume of rubber on stretching: Effects of time, elongation, and temperature. *J 17*, 657 (1936) RP936.
- Toggle clamp for rubber tensile specimens. *J 22*, 543 (1939) RP1204.
- McPherson, A. T., Scott, A. H., Dielectric constant, power factor, and conductivity of the system rubber-calcium carbonate. *J 28*, 279 (1942) RP1457.
- McPherson, A. T., Scott, A. H., Curtis, H. L., Effect of temperature and frequency on the dielectric constant, power factor, and conductivity of compounds of purified rubber and sulphur. *J 11*, 173 (1933) RP585.
- McPherson, A. T., Selker, A. H., Scott, A. H., Electrical and mechanical properties of the system Buna S-gilsonite. *J 31*, 141 (1943) RP1554.
- McPherson, A. T., Thibodeau, W. E., Photoelastic properties of soft, vulcanized rubber. *J 13*, 887 (1934) RP751.
- Meacham, M. R., Kline, G. M., Acree, S. F., On elimination of liquid potentials with potassium chloride and ammonium chloride. *J 8*, 101 (1932) RP403.
- Mears, T. W., Fookson, A., Pomerantz, P., Brooks, D. B., Howard, F. L., Preparation and physical properties of several aliphatic hydrocarbons and intermediates. *J 38*, 365 (1947) RP1779.
- Mease, R. T.: Analysis of weighted silk. *J 9*, 669 (1932) RP498.
- Determination of sulphur and sulphate in wool. *J 13*, 617 (1934) RP731.
- Measurement of the apparent fluidity of dispersions of cellulose in cuprammonium solution. *J 22*, 271 (1939) RP1179.
- An improvement in the method for dissolving cellulose in cuprammonium solution for fluidity measurements. *J 27*, 551 (1941) RP1442.
- Mease, R. T., Gleysteen, L. F., Fluidity of Triton F and xanthate solutions as a measure of cellulose degradation. *J 27*, 543 (1941) RP1441.
- Mease, R. T., Harris, M., Ruherford, H., Reaction of wool with strong solutions of sulfuric acid. *J 18*, 343 (1937) RP980.
- Mease, R. T., Jessup, D. A.: Analysis of wool-cotton textiles. *J 12*, 75 (1934) RP635.
- Analysis of textiles for cellulose-acetate rayon, silk, regenerated-cellulose rayon, cotton, and wool. *J 15*, 189 (1935) RP821.
- Mease, R. T., Worner, R. K., Effect of purification treatments on cotton and rayon. *J 21*, 609 (1938) RP1146.
- Mebis, R. W., McAdam, Jr., D. J., Tensile elastic properties of nickel, copper, open-hearth iron, and typical steels. *J 28*, 311 (1942) RP1459.
- Meggers, W. F.: Wave-length measurements in spectra from 5600 A to 9600 A. *B 14*, 371 (1918-19) S312.
- Interference measurements in the spectra of argon, krypton, and xenon. *S 17*, 193 (1922) S414.
- Investigations on the platinum metals — VII. Arc spectra of the platinum metals (4500 A to 9000 A). *S 20*, 19 (1924-26) S499.
- Wave-length measurements in the arc spectrum of scandium. *S 22*, 61 (1927-28) S549.
- Wave-length measurements in the arc and spark spectra of hafnium. *J 1*, 151 (1928) RP8.
- Wave lengths and Zeeman effects in yttrium spectra. *J 1*, 319 (1928) RP12.
- The arc spectrum of rhenium. *J 6*, 1027 (1931) RP322.
- Wave lengths and Zeeman effects in lanthanum spectra. *J 9*, 239 (1932) RP468.
- Long-wave arc spectra of alkalis and alkaline earths. *J 10*, 669 (1933) RP558.
- The infrared arc spectra of manganese and rhenium. *J 10*, 757 (1933) RP564.
- Interference measurements in the infrared arc spectrum of iron. *J 14*, 33 (1935) RP755.
- Infrared spectra of noble gases (10500 to 13000 A). *J 14*, 487 (1935) RP781.
- First spectrum of tin. *J 24*, 153 (1940) RP1275.
- Meggers, W. F., Burns, K.: Interference measurements of wave lengths in the iron spectrum (2851-3701), with notes on comparisons of lengths of light waves by interference methods, and some wave lengths in the spectrum of neon gas. *B 12*, 179 (1915-16) S251.
- Notes on standard wave lengths, spectrographs, and spectrum tubes. *S 18*, 185 (1922-23) S441.
- Meggers, W. F., Burns, K., Kiess, C. C., Standard solar wave lengths (3952 to 7148 A). *J 1*, 297 (1928) RP11.
- Meggers, W. F., Burns, K., Merrill, P. W.: Interference measurements of wave lengths in the iron spectrum (3233A to 6750A). *B 13*, 245 (1916-17) S274.
- Measurements of wave lengths in the spectrum of neon. *B 14*, 765 (1918-19) S329.
- Meggers, W. F., deBruin, T. L., The arc spectrum of arsenic. *J 3*, 765 (1929) RP116.
- Meggers, W. F., deBruin, T. L., Humphreys, C. J.: The first spectrum of krypton. *J 3*, 129 (1929) RP89.
- The first spectrum of xenon. *J 3*, 731 (1929) RP115.
- Further description and analysis of the first spectrum of krypton. *J 7*, 643 (1931) RP364.
- The second spectrum of krypton. *J 11*, 409 (1933) RP599.
- Meggers, W. F., Dieke, G. H., Infra-red spectra of helium. *J 9*, 121 (1932) RP462.
- Meggers, W. F., Foote, P. D.: A new microphotometer for photographic densities. *S 16*, 299 (1920) S385.
- Atomic theory and low-voltage arcs in caesium vapor. *S 16*, 309 (1920) S386.
- Meggers, W. F., Humphreys, C. J.: Further description and analysis of the first spectrum of xenon. *J 10*, 139 (1933) RP521.
- Infra-red spectra of neon, argon, and krypton. *J 10*, 427 (1933) RP540.
- Interference measurements in the spectra of noble gases. *J 13*, 293 (1934) RP710.
- Interference measurements of wave lengths in the ultraviolet spectrum of iron. *J 18*, 543 (1937) RP992.
- The first spectrum of antimony. *J 28*, 463 (1942) RP1464.
- Term analyses of the first two spectra of columbium. *J 34*, 477 (1945) RP1656.
- Meggers, W. F., Humphreys, C. J., deBruin, T. L.: Regularities in the second spectrum of xenon. *J 6*, 287 (1931) RP275.
- Zeeman effect in the second and third spectra of xenon. *J 23*, 683 (1939) RP1264.
- Meggers, W. F., Kiess, C. C.: Wave lengths in the red and infra-red spectra of iron, cobalt, and nickel arcs. *B 14*, 637 (1918-19) S324.
- Wave lengths longer than 5500 A in the arc spectra of seven elements. *S 16*, 51 (1920) S372.
- Interferometer measurements of the longer waves in the iron arc spectrum. *S 19*, 273 (1923-24) S479.
- Tables of theoretical Zeeman effects. *J 1*, 641 (1928) RP23.
- Infra-red arc spectra photographed with xenocyanine. *J 9*, 309 (1932) RP473.
- Meggers, W. F., Kiess, C. C., Burns, K., Redetermination of secondary standards of wave length from the new international iron arc. *S 19*, 263 (1923-24) S478.
- Meggers, W. F., Kiess, C. C., Stimson, F. J., Practical spectrographic analysis. *S 18*, 235 (1922-23) S444.
- Meggers, W. F., King, A. S., Arc and spark spectra of columbium. *J 16*, 385 (1936) RP881.
- Meggers, W. F., Langer, R. M., Light scattering in liquids. *J 4*, 711 (1930) RP175.

- Meggers, W. F., Mohler, F. L., Foote, P. D., Resonance potentials and low-voltage arcs for metals of the second group of the periodic table. S 16, 725 (1920) S403.
- Meggers, W. F., Moore, C. E., Description and analysis of the second spectrum of vanadium (V II). J 25, 83 (1940) RP1317.
- Meggers, W. F., Peters, C. G., Measurements on the index of refraction of air for wave lengths from 2218 Å to 9000 Å. B 14, 697 (1918-19) S327.
- Meggers, W. F., Priest, I. G., Gibson, K. S., Tyndall, E. P. T., McNicholas, H. J., The color and spectral composition of certain high-intensity searchlight arcs. T 13, (1919-20) T168.
- Meggers, W. F., Russell, H. N.:
An analysis of the arc and spark spectra of scandium (Sc I and Sc II). S 22, 329 (1927-28) S558.
An analysis of the arc and spark spectra of yttrium (Yt I and Yt II). J 2, 733 (1929) RP55.
An analysis of lanthanum spectra (La I, La II, La III). J 9, 625 (1932) RP497.
Term analysis of the first spectrum of vanadium (V I). J 17, 125 (1936) RP906.
- Meggers, W. F., Scribner, B. F.:
Regularities in the arc spectrum of hafnium (Hf I). J 4, 169 (1930) RP139.
Regularities in the spectra of lutecium. J 5, 73 (1930) RP187.
Second spectrum of hafnium (Hf II). J 13, 625 (1934) RP732.
Multiplets and terms in the first two spectra of columbium. J 14, 629 (1935) RP793.
Arc and spark spectra of lutecium. J 19, 31 (1937) RP1008.
Arc and spark spectra of ytterbium. J 19, 651 (1937) RP1053.
- Meggers, W. F., Walters, Jr., F. M., Absorption spectra of iron, cobalt, and nickel. S 22, 205 (1927-28) S551.
- Meggers, W. F., Watson, W. W., Spectrum of lutecium monoxide. J 20, 125 (1938) RP1071.
- Meggers, W. F., Wheeler, J. A., The band spectra of scandium-, yttrium-, and lanthanum monoxides. J 6, 239 (1931) RP273.
- Mellors, J. W., Scott, R. B., Specific heats of gaseous 1,3-butadiene, isobutene, styrene, and ethylbenzene. J 34, 243 (1945) RP1640.
- Mercier, A. A.:
Technology of cotton machinery. Part I. Calculations on pickers. T 19, 183 (1924-25) T282.
Coefficient of friction of fabrics. J 5, 243 (1930) RP196.
- Mercier, A. A., McGowan, F. R., Schoffstall, C. W.:
A study of silk waste used for cartridge-bag cloth, with an appendix on the general classification of waste silk. T 18, 567 (1924-25) T268.
Comparative wearing qualities of pima and ordinary cotton used in mail bags. T 19, 73 (1924-25) T277.
Effect of twist on the physical properties of a number 7s yarn. T 19, 85 (1924-25) T278.
- Mercier, A. A., Schoffstall, C. W., Effect of twist on cotton yarns. J 1, 733 (1928) RP27.
- Merica, P. D.:
A simplification of the inverse-rate method for thermal analysis. S 15, 101 (1919-20) S336.
Failure of brass. 2.—Effect of corrosion on the ductility and strength of brass. T 8, (1916-17) T83.
Structure of the coating on tinned sheet copper in a specific case of corrosion. T 9, (1916-17) T90.
- Merica, P. D., Burgess, G. K.:
An investigation of fusible tin boiler plugs. T 5, (1914-15) T53.
Some foreign specifications for railway materials: Rails, wheels, axles, tires. T 7, (1916-17) T61.
- Merica, P. D., Gurevich, L. J., Notes on the graphitization of white cast iron upon annealing. T 12, (1919) T129.
- Merica, P. D., Karr, C. P.:
Failure of brass. 3. Initial stress produced by the "burning in" of manganese bronze. T 8, (1916-17) T84.
Some tests of light aluminum casting alloys—the effect of heat treatment. T 12, (1919) T139.
- Merica, P. D., Schad, L. W., Thermal expansion of alpha and of beta brass between 0° and 600° C, in relation to the mechanical properties of heterogeneous brasses of the Muntz metal type. B 14, 571 (1918-19) S321.
- Merica, P. D., Wallenberg, R. G., Malleability and metallography of nickel. T 19, 155 (1924-25) T281.
- Merica, P. D., Wallenberg, R. G., Finn, A. N., Mechanical properties and resistance to corrosion of rolled light alloys of aluminum and magnesium with copper, with nickel, and with manganese. T 12, (1919) T132.
- Merica, P. D., Wallenberg, R. G., Freeman, Jr., J. R., Constitution and metallography of aluminum and its light alloys with copper and with magnesium. S 15, 105 (1919-20) S337.
- Merica, P. D., Wallenberg, R. G., Scott, H., The heat treatment of duralumin. S 15, 271 (1919-20) S347.
- Merica, P. D., Woodward, R. W.:
Failure of brass. I.—Microstructure and initial stresses in wrought brasses of the type 60 per cent copper and 40 per cent zinc. T 8, (1916-17) T82.
Behavior of wrought manganese bronze exposed to corrosion while under tensile stress. T 12, (1919) T135.
- Merrill, P. W.:
Wave lengths of stronger lines in helium spectrum. B 14, 159 (1918-19) S302.
The application of dicyanin to the photography of stellar spectra. B 14, 487 (1918-19) S318.
Measurements of wave lengths in the spectra of krypton and xenon. S 15, 251 (1919-20) S345.
- Merrill, P. W., Burns, K., Meggers, W. F.:
Interference measurements of wave lengths in the iron spectrum (3233 Å to 6750 Å). B 13, 245 (1916-17) S274.
Measurements of wave lengths in the spectrum of neon. B 14, 765 (1918-19) S329.
- Merritt, C. J., Eisman, J. H., Smith, F. A., The effect of altitude on the limits of safe operation of gas appliances. J 10, 619 (1933) RP553.
- Merritt, G. E.:
Application of the interferometer to measurements of the thermal dilation of ceramic materials. S 19, 357 (1923-24) S485.
The interference method of measuring thermal expansion. J 10, 59 (1933) RP515.
- Merritt, G. E., Smith, T. T., Bennett, A. H., Characteristics of striae in optical glass. S 16, 75 (1920) S373.
- Merritt, G. E., Tool, A. Q., Lloyd, D. B., Dimensional changes caused in glass by heating cycles. J 5, 627 (1930) RP219.
- Merritt, M. F., Pulp and paper fiber composition standards: Reference standards, showing the color reactions of common paper-making fibers and standard fiber mixtures with various stains for use in identification and estimation of fiber composition of paper. T 18, 101 (1924-25) T250.
- Merritt, M. F., Lofton, R. E., Method for differentiating and estimating unbleached sulphite and sulphate pulps in paper. T 15, (1921) T189.
- Meyer, J. F., Barrow, L. E., Characteristic equations of vacuum and gas-filled tungsten-filament lamps. J 9, 721 (1932) RP502.
- Meyer, W. W., Colloidal nature and related properties of clays. J 13, 245 (1934) RP706.
- Meyer, W. W., Klinefelter, T. A., Substitution of domestic for imported clays in whiteware bodies. J 19, 65 (1937) RP1011.
- Meyers, C. H.:
Coiled-filament resistance thermometers. J 9, 807 (1932) RP508.
Formula for specific volumes of saturated vapors. J 11, 691 (1933) RP616.
An equation for the isotherms of pure substances at their critical temperatures. J 29, 157 (1942) RP1493.
Mollier chart of properties of ammonia. M52 (1923).
Large Mollier chart. (Foot-pound-Fahrenheit units.) Properties of ammonia. M57 (1924).
Mollier chart. (Metric engineering units.) Properties of ammonia. M76 (1924).
Meyers, C. H., Cragoe, C. S., Taylor, C. S., Vapor pressure of ammonia. S 16, 1 (1920) S369.

- Meyers, C. H., Jessup, R. S., A multiple manometer and piston gages for precision measurements. J 6, 1061 (1931) RP324.
- Meyers, C. H., Osborne, N. S., A formula and tables for the pressure of saturated water vapor in the range 0° to 374° C. J 13, 1 (1934) RP691.
- Meyers, C. H., Scott, R. B., Rands, Jr., R. D., Brickwedde, F. G., Bekkedahl, N., Thermodynamic properties of 1,3-butadiene in the solid, liquid, and vapor states. J 35, 39 (1945) RP1661.
- Meyers, C. H., Van Dusen, M. S., The vapor pressure of liquid and solid carbon dioxide. J 10, 381 (1933) RP538.
- Michelson, A. A., Optical conditions accompanying the striae which appear as imperfections in optical glass. S 15, 41 (1919-20) S333.
- Mickey, L., Martin, A. D., Development of standard-frequency transmitting sets. J 12, 1 (1934) RP630.
- Middlekauff, G. W., A new form of direct-reading candlepower scale and recording device for precision photometers. B 7, 11 (1911) S144.
- Middlekauff, G. W., Mulligan, B., Skogland, J. F., Life testing of incandescent lamps at the Bureau of Standards. B 12, 605 (1915-16) S265.
- Middlekauff, G. W., Skogland, J. F., Characteristic equations of tungsten filament lamps and their application in heterochromatic photometry. B 11, 483 (1915) S238.
- Photometry of the gas-filled lamp. B 12, 587 (1915-16) S264.
- An interlaboratory photometric comparison of glass screens and of tungsten lamps, involving color differences. B 13, 27 (1916-17) S277.
- Middleton, F. A., Bruce, C. S., Engine tests with producer gas. J 36, 171 (1946) RP1698.
- Miller, C. E., Chrysler, V. L., Some of the factors which affect the measurement of sound absorption. J 9, 175 (1932) RP465.
- Miller, D. R., Houston, P. L., A study of commercial dial micrometers for measuring the thickness of paper. T 17, 125 (1922-24) T226.
- Miller, D. R., Fullmer, I. H., Standard thicknesses, weights, and tolerances of sheet metal (customary practice). C391 (1931).
- Miller, G. D., Jeffrey, G. L., Supplementary list of publications of the Bureau of Standards — July 1, 1925 to February 28, 1930. Supplement to C24, (7th ed.), (1930).
- Supplementary list of publications of the Bureau of Standards — July 1, 1925 to December 31, 1931. Supplement to C24 (7th ed.), (1932).
- Miller, J., Schiefer, H. F., Cleveland, R. S., Porter, J. W., Effect of weave on the properties of cloth. J 11, 441 (1933) RP600.
- Miller, J. A., Determination of cross-sectional areas of structural members. J 23, 621 (1939) RP1258.
- Miller, J. M., Effective resistance and inductance of iron and bimetallic wires. B 12, 207 (1915-16) S252.
- Effect of imperfect dielectrics in the field of a radiotelegraphic antenna. B 13, 129 (1916-17) S269.
- Electrical oscillations in antennas and inductance coils. B 14, 677 (1918-19) S326.
- Dependence of the input impedance of a three-electrode vacuum tube upon the load in the plate circuit. S 15, 367 (1919-20) S351.
- Miller, J. M., Rosa, E. B., Dorsey, N. E., A determination of the international ampere in absolute measure. B 8, 269 (1912) S171.
- Miller, L. C., Curtiss, L. F., A magnetic-lens electron spectrometer: radiations from 5.3 year cobalt⁵⁹. J 33, 359 (1947) RP1778.
- Milliken, K. A., Tregoning, J. J., Hockman, A., Sligh, W. H., Kessler, D. W., Plastic calking materials. BMS33 (1940).
- Minor, F. W., Rutherford, H. A., Martin, A. R., Harris, M., Oxidation of cellulose: The reaction of cellulose with periodic acid. J 29, 131 (1942) RP1491.
- Mitchell, N. D., Fire tests of columns protected with gypsum. J 10, 737 (1933) RP563.
- Tests of theatre-proscenium curtains. J 11, 491 (1933) RP603.
- Mitchell, N. D., Ingberg, S. H., Fire tests of wood- and metal-framed partitions. BMS71 (1941).
- Mizell, L. R., Geiger, W. B., Patterson, W. I., Harris, M., Nature of the resistance of wool to digestion by enzymes. J 27, 459 (1941) RP1433.
- Mizell, L. R., Harris, M., Nature of the reaction of wool with alkali. J 30, 47 (1943) RP1516.
- Mizell, L. R., Harris, M., Fourn, L., Elasticity of wool as related to its chemical structure. J 29, 73 (1942) RP1486.
- Mizell, L. R., Patterson, W. I., Geiger, W. B., Harris, M., Role of cystine in the structure of the fibrous protein, wool. J 27, 89 (1941) RP1405.
- Mizell, L. R., Schiefer, H. F., Mosedale, F. T., Part-wool blankets for use in barracks. J 30, 203 (1943) RP1528.
- Mogerman, W. D., Determination of tin in non-ferrous metals by distillation as bromide and precipitation with cupferron. J 33, 307 (1944) RP1610.
- Mogerman, W. D., Scherrer, J. A., Improved method for determination of aluminum in certain non-ferrous materials by use of ammonium aurintricarboxylate. J 21, 105 (1938) RP1117.
- Mogerman, W. D., Scherrer, A., Bell, R. K., Electroanalytical determination of copper and lead in nitric acid solution containing small amounts of hydrochloric acid. J 22, 697 (1939) RP1213.
- Mohler, F. L., Critical potentials associated with excitation of alkali spark spectra. S 20, 167 (1924-26) S505.
- Experiments on the emission and absorption of radiation by metallic silver. J 8, 357 (1932) RP421.
- Power input and dissipation in the positive column of caesium discharge. J 9, 25 (1932) RP455.
- Collisions of the first and second kind in the positive column of a caesium discharge. J 9, 493 (1932) RP485.
- Recombination radiation in the cesium positive column. J 10, 771 (1933) RP565.
- Reversal temperature and population of excited states in the cesium discharge. J 16, 227 (1936) RP869.
- Intensity distribution in the line emission spectrum of cesium. J 17, 45 (1936) RP901.
- Electron concentration and spectral energy intensity distribution in a cesium discharge. J 17, 849 (1936) RP948.
- Recombination of ions in the afterglow of a cesium discharge. J 19, 447 (1937) RP1036.
- Recombination in the afterglow of a mercury discharge. J 19, 559 (1937) RP1045.
- Cesium discharge under conditions of nearly complete ionization. J 21, 697 (1938) RP1150.
- Resistivity and power input in the cesium discharge at high current density. J 21, 873 (1938) RP1162.
- Recombination and electron attachment in the F layers of the ionosphere. J 25, 507 (1940) RP1342.
- Mohler, F. L., Boeckner, C., Recombination spectra of ions and electrons in caesium and helium. J 2, 489 (1929) RP46.
- Photoionization of some alkali vapors. J 3, 303 (1929) RP96.
- Photoionization of caesium by line absorption. J 5, 51 (1930) RP186.
- Effects of gases on photo-ionization of caesium by line absorption. J 5, 399 (1930) RP208.
- Photo-ionization of caesium vapor by absorption from the series lines. J 5, 831 (1930) RP234.
- Radiation from metals bombarded by low-speed electrons. J 6, 673 (1931) RP297.
- Radiation from probe surfaces bombarded by electrons. J 7, 751 (1931) RP371.
- Scattering of electrons by ions and the mobility of electrons in a caesium discharge. J 10, 357 (1933) RP535.
- Mohler, F. L., Foote, P. D., Ionization and resonance potentials of some non-metallic elements. S 16, 669 (1920) S400.
- Characteristic soft X-rays from arcs in gases and vapors. S 17, 471 (1922) S425.
- Mohler, F. L., Foote, P. D., Meggers, W. F., Resonance potentials and low-voltage arcs for metals of the second group of the periodic table. S 16, 725 (1920) S403.

- Mohler, F. L., Foote, P. D., Stimson, H. F., Ionization and resonance potentials for electrons in vapors of lead and calcium. S 15, 723 (1919-20) S368.
- Mohler, F. L., Reese, R. M., Dibeler, V. H., Mass spectrometer study of rare gases. J 38, 617 (1947) RP1799.
- Mohler, F. L., Ruark, A. E., Foote, P. D., Chenault, R. L., Spectra and critical potentials of fifth group elements. S 19, 463 (1923-24) S490.
- Mohler, F. L., Taylor, L. S.: Ionization of liquid carbon disulphide by X-rays. J 13, 659 (1934) RP733.
- A note on bactericidal effects of X-rays. J 13, 677 (1934) RP736.
- Money, J. T., Gould, R. E., Time zone map of the United States and adjacent parts of Canada and Mexico. M111 (1930).
- Mong, L. E., Elastic behavior and creep of refractory bricks under tensile and compressive loads. J 38, 229 (1947) RP1770.
- Mong, L. E., Heindl, R. A.: Preparation of experimental sagger bodies according to fundamental properties. J 3, 419 (1929) RP104.
- The life of the sagger as affected by varying certain properties. J 7, 1017 (1931) RP387.
- Young's modulus of elasticity, strength, and extensibility of refractories in tension. J 17, 463 (1936) RP923.
- Length changes and endothermic and exothermic effects during heating of flint and aluminous clays. J 23, 427 (1939) RP1243.
- Mong, L. E., Heindl, R. A., Pendergast, W. L., Kaolins: Effect of firing temperature on some of their physical properties. J 8, 199 (1932) RP410.
- Montgomery, E. T., Some leadless borosilicate glazes maturing at about 1100° C. T 3, (1911-16) T31.
- Montgomery, E. T., Bleininger, A. V., The effect of overfiring upon the structure of clays. T 3, (1911-16) T22.
- Montgomery, E. T., Brown, G. H., The dehydration of clays. T 3, (1911-16) T21.
- Moon, C.: A precision method of calibrating a tuning fork by comparison with a pendulum. J 4, 213 (1930) RP144.
- Apparatus for comparison of length of gages. J 10, 249 (1933) RP528.
- A precision cathetometer. J 14, 363 (1935) RP774.
- Moon, C., Curtis, H. L., Absolute measurement of capacitance by Maxwell's method. S 22, 487 (1927-28) S564.
- Moon, C., Curtis, H. L., Sparks, C. M.: An absolute determination of the ohm. J 16, 1 (1936) RP857.
- A determination of the absolute ohm, using an improved self inductor. J 21, 375 (1938) RP1137.
- Moore, C. E., Meggers, W. F., Description and analysis of the second spectrum of vanadium (V II). J 25, 83 (1940) RP1317.
- Moore, D. G., Harrison, W. N.: Surface tension of vitreous enamel frits at and near firing temperatures. J 21, 337 (1938) RP1133.
- Effects of humidity and composition on strength and Young's modulus of enamels. J 23, 329 (1939) RP1237.
- Weather resistance of porcelain-enameled iron structural units. J 28, 735 (1942) RP1476.
- Moore, D. G., Harrison, W. N., Richmond, J. C., Ceramic coatings for high-temperature protection of steel. J 38, 293 (1947) RP1773.
- Moore, H. R., Blum, W., Conductivity and density of chromic acid solutions. J 5, 255 (1930) RP198.
- Moore, O. C., Schreiber, W. T., Geib, M. N. V.: Consistency of potato-starch size. J 11, 765 (1933) RP623.
- Effect of sizing, weaving, and abrasion on the physical properties of cotton yarn. J 18, 559 (1937) RP993.
- Moore, R. L., Epstein, S. W., Determination of cellulose in rubber goods. T 13, (1919-20) T154.
- Morey, F. C., Thickness of a liquid film adhering to a surface slowly withdrawn from the liquid. J 26, 385 (1940) RP1332.
- Morey, G. W., Benzoic acid as an acidimetric standard. B 8, 643 (1912) S183.
- Morris, R. J., Relative merits of cotton and jute cement sacks. T 19, 515 (1924-25) T292.
- Mosedale, F. T., Schiefer, H. F., Mizell, L. R., Part-wood blankets for use in barracks. J 30, 203 (1943) RP1528.
- Moser, H. A., Roeser, W. F., Schofield, F. H., An international comparison of temperature scales between 660° and 1,063° C. J 11, 1 (1933) RP573.
- Moskowi, M., Aston, J. G., Brickwedde, F. G., Equilibrium constant of some reactions involved in the production of 1,3-butadiene. J 37, 263 (1946) RP1747.
- Moulton, G. F., Berry, W. M., Brumbaugh, I. V., Eiseaman, J. H., Shaw, G. B., Relative usefulness of gases of different heating value and adjustments of burners for changes in heating value and specific gravity. T 17, 15 (1922-24) T222.
- Moulton, G. F., Berry, W. M., Brumbaugh, I. V., Shaw, G. B., Design of atmospheric gas burners. T 15, (1921) T193.
- Movius, H. G., Scott, H., Thermal and physical changes accompanying the heating of hardened carbon steels. S 16, 537 (1920) S396.
- Mueller, E. F., Wheatstone bridges and some accessory apparatus for resistance thermometry. B 13, 547 (1916-17) S288.
- Mueller, E. F., Burgess, H. A., Standardization of the sulphur boiling point. S 15, 163 (1919-20) S339.
- Mueller, E. F., Dickinson, H. C.: Calorimetric resistance thermometers and the transition temperature of sodium sulphate. B 3, 641 (1907) S68.
- New calorimetric resistance thermometers. B 9, 483 (1913) S200.
- Mueller, E. F., Dickinson, H. C., George, E. B., Specific heat of some calcium chloride solutions between -35° C and +20° C. B 6, 379 (1909-10) S135.
- Mueller, E. F., Roeser, W. F., Measurement of surface temperatures. J 5, 793 (1930) RP231.
- Mueller, E. F., Stimson, H. F., A temperature-control box for saturated standard cells. J 13, 699 (1934) RP739.
- Mueller, E. F., Waidner, C. W., Industrial gas calorimetry. T 4, (1913-14) T36.
- Mueller, E. F., Waidner, C. W., Dickinson, H. C., Harper, S. D., D. R., A wheatstone bridge for resistance thermometry. B 11, 571 (1915) S241.
- Mueller, E. F., Wenner, F., The Waidner-Wolf and other adjustable electrical-resistance elements. J 15, 477 (1935) RP842.
- Mueller, H. P., Slater, W. A., Smith, G. A., Effect of repeated reversals of stress on double-reinforced concrete beams. T 14, (1920-21) T182.
- Mulligan, B., Middlekauff, G. W., Skogland, J. F., Life testing of incandescent lamps at the Bureau of Standards. B 12, 605 (1915-16) S265.
- Mullin, H. R., Scribner, B. F., Carrier-distillation method for spectrographic analysis and its application to the analyses of uranium-base materials. J 37, 379 (1946) RP1753.
- Murphy, E. T., Cahill, J. C., Flanagan, H. F., Sedlak, V. A., Willingham, C. B., Rossini, F. D., Streiff, A. J., Purification, purity, and freezing points of 8 nonanes, 11 alkylcyclopentanes, 6 alkylcyclohexanes, and 4 butylbenzenes of the American Petroleum Institute-Standard and American Petroleum Institute-National Bureau of Standards series. J 38, 53 (1947) RP1760.
- Murphy, E. T., Streiff, A. J., Sedlak, V. A., Willingham, C. B., Rossini, F. D., Purification, purity, and freezing points of 7 heptanes, 16 octanes, 6 pentenes, cyclopentene, and 7 C₈H₁₂ alkylbenzenes of the American Petroleum Institute-Standard and American Petroleum Institute-National Bureau of Standards series. J 37, 331 (1946) RP1752.
- Murphy, E. T., Willingham, C. B., Rossini, F. D., Glasgow, Jr., A. R., Purification, purity, and freezing points, of 31 hydrocarbons of the American Petroleum Institute-National Bureau of Standards series. J 37, 141 (1946) RP1734.
- Murphy, P. S., Bean, H. S., Buckingham, E., Discharge coefficients of square-edged orifices for measuring the flow of air. J 2, 561 (1929) RP49.

- Murray, C. N., Acree, S. F., The use of saturated ammonium chloride in the elimination of contact potentials. J 7, 713 (1931) RP369.
- Murray, G. A., Brown, G. H., The function of time in the vitrification of clays. T 2, (1912-14) T17.
- Mutcher, W., Corrosion of metals used in aircraft. J 25, 75 (1940) RP1316.
- N
- Naffziger, T. R., Wingfield, B., Whittemore, E. R., Overman, C. B., Sweeney, O. R., Acree, S. F., Production of pressboard from cornstalks. M123 (1936).
- Nagle, J. L., Fishburn, C. C., Tests on a reinforced-concrete arch of the Arlington Memorial Bridge. J 11, 567 (1933) RP609.
- National Bureau of Standards Advisory Committee for the Preparation of the Discussion Handbook, Discussion of the National Electrical Safety Code, Part 2, and Grounding Rules. H39 (1944).
- Neal, P. A., Shepherd, M., Schukmann, S., Flinn, R. H., Hough, J. W., Hazard of mercury vapor in scientific laboratories. J 26, 357 (1941) RP1383.
- Neeland, G. K., Davis, R.:
An experimental study of several methods of representing photographic sensitivity. J 7, 495 (1931) RP355.
Variation of photographic sensitivity with different light sources. J 7, 843 (1931) RP378.
A comparison of several developers and the specification of relative sensitivity. J 11, 379 (1933) RP598.
- Nefflen, E., Harris, F. K., Cooter, I. L., Peters, C. G., Emerson, W. B., Electrical methods for diamond-die production. J 38, 449 (1947) RP1787.
- Nefflen, K. F., Peters, C. G., Harris, F. K., Diamond cutting accelerated by an electric arc. J 34, 587 (1945) RP1657.
- Neville, H. A., Harris, M., Selective adsorption from soap solutions. J 14, 765 (1935) RP801.
- Neville, H. A., Harris, M., Fritz, W. C., Iodine number of wool: A method for determining the action of various chemical reagents on wool and other proteins. J 12, 803 (1934) RP689.
- Neville, R. P., Cain, J. R., The preparation and properties of pure iron alloys: I. Effects of carbon and manganese on the mechanical properties of iron. S 18, 411 (1922-23) S453.
- Newkirk, W. B., A pycnometer for the determination of density of molasses. T 13, (1919-20) T161.
- Newman, E. S.:
Behavior of calcium sulfate at high temperatures. J 27, 191 (1941) RP1413.
- Newman, E. S., Heats of solution of solid solutions of hexacalcium dialumina ferrite and dicalcium ferrite. J 38, 661 (1947) RP1805.
- Newman, E. S., Blaine, R. L., Jumper, C. H., Kalousek, G. L., Effects of added materials on some properties of hydrating portland cement clinkers. J 30, 281 (1943) RP1533.
- Newman, E. S., Flint, E. P., Clarke, W. F., Shartsis, L., Bishop, D. L., Wells, L. S., Extraction of alumina from clays and high-silica bauxites. J 36, 63 (1946) RP1691.
- Newman, E. S., Insley, H., Flint, E. P., Swenson, J. A., Relation of compositions and heats of solution of portland cement clinker. J 21, 355 (1938) RP1135.
- Newman, E. S., Wells, L. S.:
Heats of hydration and transition of calcium sulfate. J 20, 825 (1938) RP1107.
Effect of some added materials on dicalcium silicate. J 36, 137 (1946) RP1696.
- Newman, S. B., Stang, A. H., Greenspan, M.:
Dynamic tensile tests of parachute webbing. J 36, 411 (1946) RP1710.
Poisson's ratio of some structural alloys for large strains. J 37, 211 (1946) RP1742.
- Newman, S. B., Wexler, A., Phelan, V. B., Structural properties of prefabricated plywood light-weight construction for walls, partitions, floors, and roofs sponsored by the Douglas Fir Plywood Association. BMS104 (1945).
- Newman, S. B., Wheeler, H. G., Impact strength of nylon and of sisal ropes. J 35, 417 (1945) RP1697.
- Nickerson, D., Kelly, K. L., Gibson, K. S., Tristimulus specification of the Munsell book of color from spectrophotometric measurements. J 31, 55 (1943) RP1549.
- Nicholas, W. W.:
Continuous spectrum X-rays from thin targets. J 2, 837 (1929) RP60.
Efficiency of production of X-rays. J 5, 843 (1930) RP235.
Optimum use of material in biological assays. J 6, 77 (1931) RP263.
An electrostatic voltmeter. J 8, 111 (1932) RP404.
- Nicholas, W. W., Malmberg, C. G., Registration of cathode rays by thin films of metals and metal compounds. J 8, 61 (1932) RP400.
- Nolan, J. E., Breckenridge, F. C., Relative visibility of luminous flashes from neon lamps and from incandescent lamps with and without red filters. J 3, 11 (1929) RP78.
- Norton, K. A., Diamond, H., Lapham, E. G., On the accuracy of radio field-intensity measurement at broadcast frequencies. J 21, 795 (1938) RP1156.
- Norton, K. A., Gilliland, T. R., Kenrick, G. W., Investigations of Kennelly-Heaviside layer heights for frequencies between 1,600 and 8,650 kilocycles per second. J 7, 1083 (1931) RP390.
- Norton, K. A., Kirby, S. S., Radio field intensity measurements at frequencies from 285 to 5,400 kilocycles per second. J 8, 463 (1932) RP429.
- Norton, K. A., Kirby, S. S., Berkner, L. V., Gilliland, T. R., Radio observations of the Bureau of Standards during the solar eclipse of August 31, 1932. J 11, 629 (1933) RP629.
- Norton, K. A., Kirby, S. S., Lester, G. H., An analysis of continuous records of field intensity at broadcast frequencies. J 13, 897 (1934) RP752.
- Norton, K. A., Reymer, S. E., A continuous recorder of radio field intensities. J 11, 373 (1933) RP597.
- Noyes, W. A., The atomic weight of hydrogen. B 4, 179 (1907-08) S77.
- Noyes, W. A., Weber, H. C. P., The atomic weight of chlorine. B 4, 345 (1907-08) S81.
- Nusbaum, C., Cheney, W. L., Effect of the rate of cooling on the magnetic and other properties of an annealed eutectoid carbon steel. S 17, 65 (1922) S408.
- Nusbaum, C., Cheney, W. L., Scott, H., The magnetic reluctivity relationship as related to certain structures of a eutectoid-carbon steel. S 16, 739 (1920) S404.
- Nusbaum, G. W., Wenner, F., Cruickshanks, B. C., Note on the electrical resistance of contacts between nuts and bolts. J 5, 757 (1930) RP227.
- Nusbaum, G. W., Whittemore, H. L., Seagquist, E. O.:
The relation of torque to tension for threadlocking devices. J 7, 945 (1931) RP386.
Impact and static tensile properties of bolts. J 14, 139 (1935) RP763.
- Nutting, P. G.:
The spectra of mixed gases. B 1, 77 (1903-05) S4.
On secondary spectra and the conditions under which they may be produced. B 1, 83 (1903-05) S5.
Some new rectifying effects in conducting gases. B 1, 95 (1903-05) S6.
The relative intensities of metal and gas spectra from electrically conducting gases. B 1, 399 (1903-05) S19.
A five-thousand volt generator set. B 1, 449 (1903-05) S25.
Polarimetric sensibility and accuracy. B 2, 249 (1906) S35.
A pocket spectrophotometer. B 2, 317 (1906) S39.
Purity and intensity of monochromatic light sources. B 2, 439 (1906) S44.
Complete form of Fechner's law. B 3, 59 (1907) S49.
The luminous properties of electrically conducting helium gas. B 4, 511 (1907-08) S89.
The luminous equivalent of radiation. B 5, 261 (1908-09) S103.
A method for constructing the natural scale of pure color. B 6, 89 (1909-10) S118.
The resolving power of objectives. B 6, 121 (1909-10) S122.
Luminosity and temperature. B 6, 337 (1909-10) S133.

- The visibility of radiation. A recalculation of König's data. B 7, 235 (1911) S154.
- A photometric attachment for spectrosopes. B 7, 239 (1911) S155.
- The luminous properties of electrically conducting helium gas. II. Reproducibility. B 8, 487 (1912) S176.
- A new precision colorimeter. B 9, 1 (1913) S187.
- Nutting, P. G., Tugman, O., The intensities of some hydrogen, argon, and helium lines in relation to current and pressure. B 7, 49 (1911) S146.
- O
- Oakes, C. E., Dickinson, J. A., Results of a survey of elevator interlocks and an analysis of elevator accident statistics. T 15, (1921) T202.
- O'Connor, G. F., Cragoe, C. S., McKelvey, E. C., Specific volume of saturated ammonia vapor. S 18, 707 (1922-23) S467.
- O'Leary, M. J., Shaw, M. B.: Study of the effect of fiber components on the stability of book papers. J 17, 859 (1936) RP949.
- Effect of filling and sizing materials on stability of book papers. J 21, 671 (1938) RP1149.
- O'Leary, M. J., Shaw, M. B., Bicking, G. W.: Further study of paper-coating minerals and adhesives. J 5, 1189 (1930) RP254.
- The paper-making properties of phormium tenax (New Zealand flax). J 6, 411 (1931) RP285.
- A study of the relation of some properties of cotton rags to the strength and stability of experimental papers made from them. J 14, 649 (1935) RP794.
- O'Leary, M. J., Weber, C. G., Shaw, M. B.: Papermaking quality of cornstalks. M147 (1935).
- Further experimental study of beater practice in the manufacture of offset papers. J 30, 267 (1943) RP1532.
- Suitability of sweetpotato starch for the beater sizing of paper. M150 (1935).
- O'Leary, M. J., Weber, C. G., Shaw, M. B., Geib, M. N., An experimental study of beater practice in the manufacture of offset papers. J 28, 241 (1942) RP1455.
- Orton, W. H., Davies, G. L., Graphical determination of polar pattern of directional antenna systems. J 8, 555 (1932) RP435.
- Osgood, W. R., Rectangular plate loaded along two adjacent edges by couples in its own plane. J 28, 159 (1942) RP1450.
- Osborne, N. S.: Aneroid calorimeter for specific and latent heats. B 14, 133 (1918-19) S301.
- Calorimetry of a fluid. J 4, 609 (1930) RP168.
- Heat of fusion of ice. A revision. J 23, 643 (1939) RP1260.
- Osborne, N. S., Dickinson, H. C.: An aneroid calorimeter. B 12, 23 (1915-16) S247.
- Specific heat and heat of fusion of ice. B 12, 49 (1915-16) S248.
- Osborne, N. S., Dickinson, H. C., Harper, 3d., D. R., Latent heat of fusion of ice. B 10, 235 (1914) S209.
- Osborne, N. S., McKelvey, E. C., Bearce, H. W., Density and thermal expansion of ethyl alcohol and of its mixtures with water. B 9, 327 (1913) S197.
- Osborne, N. S., Meyers, C. H., A formula and tables for the pressure of saturated water vapor in the range 0° to 374° C. J 13, 1 (1934) RP691.
- Osborne, N. S., Stimson, H. F., Fiock, E. F., A calorimetric determination of thermal properties of saturated water and steam from 0° to 270° C. J 5, 411 (1930) RP209.
- Osborne, N. S., Stimson, H. F., Fiock, E. F., Ginnings, D. C., The pressure of saturated water vapor in the range 100° to 374° C. J 10, 155 (1933) RP 523.
- Osborne, N. S., Stimson, H. F., Ginnings, D. C.: Calorimetric determination of the thermodynamic properties of saturated water in both the liquid and gaseous states from 100° to 374° C. J 18, 389 (1937) RP983.
- Measurements of heat capacity and heat of vaporization of water in the range 0° to 100° C. J 23, 197 (1939) RP1228.
- Thermal properties of saturated water and steam. J 23, 261 (1939) RP1229.
- Osborne, N. S., Stimson, H. F., Sligh, Jr., T. S., A flow calorimeter for specific heats of gases. S 20, 119 (1924-26) S503.
- Osborne, N. S., Stimson, H. F., Sligh, Jr., T. S., Cragoe, C. S., Specific heat of superheated ammonia vapor. S 20, 65 (1924-26) S501.
- Osborne, N. S., Van Dusen, M. S.: The specific heat of liquid ammonia. B 14, 397 (1918-19) S313.
- The latent heat of pressure variation of liquid ammonia. B 14, 433 (1918-19) S314.
- The latent heat of vaporization of ammonia. B 14, 439 (1918-19) S315.
- Osborne, N. S., Veazey, B. H., The testing of glass volumetric apparatus. B 4, 553 (1907-08) S92.
- Osgood, W. R.: Column curves and stress-strain diagrams. J 9, 571 (1932) RP492.
- Contribution to the design of compression members in aircraft. J 13, 157 (1934) RP698.
- Determination of principal stresses from strains on four intersecting gage lines 45° apart. J 15, 579 (1935) RP851.
- Stresses in a rectangular knee of a rigid frame. J 27, 443, (1941) RP1431.
- Osgood, W. R., Stang, A. H., Greenspan, M.: Strength of a riveted steel rigid frame having straight flanges. J 21, 269 (1938) RP1130.
- Strength of a riveted steel rigid frame having a curved inner flange. J 21, 853 (1938) RP1161.
- Osgood, W. R., Sturm, R. G., The determination of stresses from strains on three intersecting gage lines and its application to actual tests. J 10, 685 (1933) RP559.
- Osgood, W. R., Tuckerman, L. B., Stang, A. H., Test of a flat steel-plate floor under loads. J 12, 363 (1934) RP662.
- Ould, R. S., Dellinger, J. H., Whittemore, L. E., Radio instruments and measurements. C74 (2d ed.), (1924).
- Overman, C. B., Whittemore, E. R., Wingfield, B., Separation of cornstalks into long fibers, pith, and fines. M148 (1935).
- Overman, C. B., Wingfield, B., Naffziger, T. R., Whittemore, E. R., Sweeney, O. R., Acree, S. F., Production of pressboard from cornstalks. M123 (1936).
- Overman, C. B., Wingfield, B., Whittemore, E. R., Sweeney, O. R., Acree, S. F., Paper pulp from cereal straws by a modified sulfate process. M124 (1936).
- Owen, S. J., Safety for the household. C463 (1947).
- P
- Paffenbarger, G. C., Judd, D. B., Harrison, W. N., Sweo, B. J., Hickson, E. F., Eickhoff, A. J., Shaw, M. B., Optical specification of light-scattering materials. J 19, 287 (1937) RP1026.
- Page, B. L., Judson, L. V., Calibrations of the line standards of length of the National Bureau of Standards. J 13, 757 (1934) RP743.
- Page, B. L., Peters, C. G., A new interference apparatus for testing haemacytometers. S 20, 221 (1924-26) S507.
- Palmer, L. A.: Cause and prevention of kiln and dry-house scum and of efflorescence on face-brick walls. T 22, 579 (1927-28) T370.
- Some absorption properties of clay bricks. J 3, 105 (1929) RP83.
- Volume changes in brick masonry materials. J 6, 1003 (1931) RP321.
- Palmer, L. A., Hall, J. V., Durability and strength of bond between mortar and brick. J 6, 473 (1931) RP290.
- Palmer, L. A., Parsons, D. A., A study of the properties of mortars and bricks and their relation to bond. J 12, 609 (1934) RP683.
- Palmer, P. E., Weaver, E. R., Thermal-conductivity method for the analysis of gases. T 18, 35 (1924-25) T249.
- Parham, O. L., Brewer, A. K., Madorsky, S. L., Taylor, J. K., Dibeler, V. H., Bradt, P., Britten, R. J., Reid, Jr., J. G., Concentration of isotopes of potassium by the counter-current electromigration method. J 38, 137 (1947) RP1765.

- Park, J. H.:*
Effect of service temperature conditions on the electromotive force of unsaturated portable standard cells. *J 10*, 89 (1933) RP518.
Accuracy of high-range current transformers. *J 14*, 367 (1935) RP775.
Effect of wave form upon the performance of current transformers. *J 19*, 517 (1937) RP1041.
- Park, J. H., Lewis, A. B.,* Standard electrodynamic wattmeter and ac-dc transfer instrument. *J 25*, 545 (1940) RP1344.
- Park, J. H., Silsbee, F. B., Smith, R. L., Forman, N. L.,* Equipment for testing current transformers. *J 11*, 93 (1933) RP580.
- Parkinson, T.,* Some observations of short-period radio fading. *J 2*, 1057 (1929) RP70.
- Parkinson, T., Dellinger, J. H., Jolliffe, C. B.,* Cooperative measurements of radio fading in 1925. *S 23*, 419 (1927-28) S561.
- Parkinson, T., Gilliland, T. R.,* A radio method for synchronizing recording apparatus. *J 6*, 195 (1931) RP269.
- Parry, W.:*
Federal and State laws relating to weights and measures. *M20* (3d ed.), (1926).
The international metric system of weights and measures. *M135* (1932).
- Parsons, D. A.,* Clay in concrete. *J 10*, 257 (1933) RP529.
- Parsons, D. A., Palmer, L. A.,* A study of the properties of mortars and bricks and their relation to bond. *J 12*, 609 (1934) RP683.
- Parsons, D. E.,* Factors affecting the strength of masonry hollow units. *J 6*, 857 (1931) RP310.
- Parsons, D. E., Fishburn, C. C.,* Tests of cement-water paints and other waterproofings for unit-masonry walls. *BMS95* (1943).
- Parsons, D. E., Fishburn, C. C., Petersen, P. H.,* Effect of outdoor exposure on the water permeability of masonry walls. *BMS76* (1941).
- Parsons, D. E., Fishburn, C. C., Watstein, D.,* Water permeability of masonry walls. *BMS7* (1938).
- Parsons, D. E., McBurney, J. W.,* Wick test for efflorescence of building brick. *J 19*, 105 (1937) RP1015.
- Parsons, D. E., Stang, A. H.:*
Tests of hollow tile and concrete slabs reinforced in one direction. *T 19*, 465 (1924-25) T291.
Tests of composite beams and slabs of hollow tile and concrete. *J 4*, 815 (1930) RP181.
- Parsons, D. E., Stang, A. H., Foster, H. D.,* Compressive and transverse strength of hollow tile walls. *T 20*, 317 (1925-26) T311.
- Parsons, D. E., Stang, A. H., McBurney, J. W.:*
Compressive strength of clay brick walls. *J 3*, 507 (1929) RP108.
Shear tests of reinforced brick masonry beams. *J 9*, 749 (1932) RP504.
- Parsons, D. E., Stang, A. H., McDaniel, A. B.,* Strength of interlocking-rib tile walls. *T 22*, 389 (1927-28) T366.
- Parsons, D. E., Stang, A. H., Whittemore, H. L.,* Some tests of steel columns incased in concrete. *J 16*, 265 (1936) RP873.
- Parsons, D. E., Watstein, D.,* Compressive strength of structural tile masonry. *J 18*, 215 (1937) RP972.
Width and spacing of tensile cracks in axially reinforced concrete cylinders. *J 31*, 1 (1943) RP1545.
- Parsons, D. E., Whittemore, H. L., Stang, A. H.:*
Structural properties of six masonry wall constructions. *BMS5* (1938).
Structural properties of "Twachtman" constructions for walls and floors sponsored by Connecticut Pre-Cast Buildings Corporation. *BMS20* (1939).
Structural properties of a concrete-block cavity-wall construction sponsored by the National Concrete Masonry Association. *BMS21* (1939).
Structural properties of "Dun-Ti-Stone" wall construction sponsored by the W. E. Dunn Manufacturing Company. *BMS22* (1939).
Structural properties of a brick cavity-wall construction sponsored by the Brick Manufacturers Association of New York, Inc. *BMS23* (1939).
- Structural properties of two brick-concrete-block wall constructions and a concrete-block wall construction sponsored by the National Concrete Masonry Association. *BMS32* (1939).
- Structural properties of two "Dunstone" wall constructions sponsored by the W. E. Dunn Manufacturing Co. *BMS38* (1940).
- Structural properties of a wall construction of "Pfeifer Units" sponsored by the Wisconsin Units Company. *BMS39* (1940).
- Structural properties of "Tilecrete Type A" floor construction sponsored by the Tilecrete Co. *BMS51* (1940).
- Structural properties of a masonry wall construction of "Munlock Dry Wall Brick" sponsored by the Munlock Engineering Co. *BMS53* (1940).
- Structural properties of two nonreinforced monolithic concrete wall constructions. *BMS61* (1940).
- Structural properties of a precast joist concrete floor construction sponsored by the Portland Cement Association. *BMS62* (1940).
- Parsons, S. R., Harper, 3d., D. R.,* Radiators for aircraft engines. *T 16*, 247 (1921-22) T211.
- Parsons, W. H., Insley, H.,* Attack on refractory clay pots by optical glasses. *J 36*, 31 (1946) RP1689.
- Parsons, W. H., Johnson, W. H.,* Thermal expansion of concrete aggregate materials. *J 32*, 101 (1944) RP1578.
- Parsons, W. H., Steierman, B. L., Insley, H.,* Size grading of diamond powders. *J 36*, 469 (1946) RP1716.
- Patterson, G. W., Keulegan, G. H.:*
Mathematical theory of irrotational translation waves. *J 24*, 47 (1940) RP1272.
Effect of turbulence and channel slope on translation waves. *J 30*, 461 (1943) RP1544.
- Patterson, W. I., Geiger, W. B., Mizell, L. R., Harris, M.:*
Role of cystine in the structure of the fibrous protein, wool. *J 27*, 89 (1941) RP1405.
Nature of the resistance of wool to digestion by enzymes. *J 27*, 459 (1941) RP1433.
- Patterson, W. I., Rutherford, H. A., Harris, M.,* Reaction of silk fibroin with diazomethane. *J 25*, 451 (1940) RP1338.
- Pearson, J. C., Sligh, W. H.,* An air analyzer for determining the fineness of cement. *T 5*, (1914-15) T48.
- Pearson, J. C., Wig, R. J.:*
Variation in results of sieving with standard cement sieves. *T 3*, (1911-16) T29.
Standardization of No. 200 cement sieves. *T 4*, (1913-14) T42.
- Pearson, J. C., Wig, R. J., Emley, W. E.,* Durability of stucco and plaster construction. *T 7*, (1916-17) T70.
- Peck, M. F., Easton, A. H., Luxford, R. F.,* Structural properties of "Precision-Built, Jr." prefabricated wood-frame wall construction sponsored by the Homasote Co. *BMS72* (1941).
- Peck, M. F., Hoback, W. G., Phelan, V. B., Winslow, C. P.,* Structural properties of "PHC" prefabricated wood-frame constructions for walls, floors, and roofs sponsored by the PHC Housing Corporation. *BMS90* (1942).
- Peck, M. F., Phelan, V. B., Dill, R. S., Petersen, P. H.,* Structural, heat-transfer, and water-permeability properties of "Speedbrik" wall construction sponsored by the General Shale Products Corporation. *BMS86* (1942).
- Peffer, E. L.:*
Device for testing haemocytometers and other pipettes of small capacity. *J 19*, 177 (1937) RP1019.
Gallage tables for horizontal cylindrical tanks with flat ends. *C416* (1937).
- Peffer, E. L., Bearce, H. W.,* Density and thermal expansion of American petroleum oils. *T 8*, (1916-17) T77.
- Peffer, E. L., Blair, M. G.:*
Thermal density coefficients and hydrometer correction tables for vegetable tanning extracts. *J 33*, 341 (1944) RP1612.
Hydrometer correction tables and thermal density coefficients for vegetable tanning extracts. *C449* (1945).

- Peffer, E. L., Holler, H. D., Relation between composition and density of aqueous solutions of copper sulphate and sulphuric acid. B 13, 273 (1916-17) S275.
- Pendergast, W. L., Heindl, R. A.: Progress report on investigation of fire-clay bricks and the clays used in their preparation. J 3, 691 (1929) RP114.
- Fire clays. Some fundamental properties at several temperatures. J 5, 213 (1930) RP194.
- Olivine as a refractory. J 12, 215 (1934) RP645.
- Young's modulus of elasticity at several temperatures for some refractories of varying silica content. J 13, 851 (1934) RP747.
- Deformation and Young's modulus of fire-clay brick in flexure at 1,220° C. J 19, 353 (1937) RP1030.
- Properties of air-setting refractory-bonding mortars of the wet type. J 23, 7 (1939) RP1219.
- Some properties of the dry air-setting type of refractory bonding mortar. J 28, 401 (1942) RP1461.
- Some properties of heat-setting refractory mortars. J 30, 303 (1943) RP1534.
- Panel tests for thermal spalling of fire-clay bricks used at high temperatures. J 34, 73 (1945) RP1630.
- Pendergast, W. L., Heindl, R. A., Mong, L. E., Kaolins: effect of firing temperature on some of their physical properties. J 8, 199 (1932) RP410.
- Pendergast, W. L., Insley, H., The service of refractory blocks in a small experimental glass tank. J 2, 453 (1929) RP44.
- Peters, C. G., Measurements of the index of refraction of glass at high temperatures. S 20, 635 (1924-26) S521.
- Peters, C. G., Boyd, H. S., Interference methods for standardizing and testing precision gage blocks. S 17, 677 (1922) S436.
- Peters, C. G., Cragoe, C. H., Measurements of the thermal dilatation of glass at high temperatures. S 16, 449 (1920) S393.
- Peters, C. G., Emerson, W. B., Nefflen, E., Harris, F. K., Cooter, I. L., Electrical methods for diamond-die production. J 33, 449 (1947) RP1787.
- Peters, C. G., Knoop, F., Emerson, W. B., A sensitive pyramidal-diamond tool for indentation measurements. J 23, 39 (1939) RP1220.
- Peters, C. G., Meggers, W. F., Measurements on the index of refraction of air for wave lengths from 2218 Å to 9000 Å. B 14, 697 (1918-19) S327.
- Peters, C. G., Nefflen, K. F., Harris, F. K., Diamond cutting accelerated by an electric arc. J 34, 587 (1945) RP1657.
- Peters, C. G., Page, B. L., A new interference apparatus for testing haemacytometers. S 20, 221 (1924-26) S507.
- Peters, C. G., Priest, I. G., Measurement and specification of the physical factors which determine the saturation of certain tints of yellow. T 9, (1916-17) T92.
- Peters, C. G., Souder, W. H., An investigation of the physical properties of dental materials. T 13, (1919-20) T157.
- Peters, C. G., Wood, L. A., Bekkedahl, N., Application of the interferometer to the measurement of dimensional changes in rubber. J 23, 571 (1939) RP1253.
- Peters, H. H., Phelps, F. P.: Color in the sugar industry. I. Color nomenclature in the sugar industry. II. Colorimetric clarification of turbid sugar solutions. T 21, 261 (1923-27) T338.
- A technical method of using the mercury arc to obtain data at wave length 560 mμ in the spectrophotometric analysis of sugar products. J 2, 335 (1929). RP38.
- Peters, M. F., Blackburn, G. F., Hannen, P. T.: Theory of voltage dividers and their use with cathode ray oscillographs. J 9, 81 (1932) RP460.
- Electrical character of the spark discharge of automotive ignition systems. J 19, 401 (1937) RP1032.
- Peters, M. F., Fairchild, C. O., Hoover, W. H., A new determination of the melting point of palladium. J 2, 931 (1929) RP65.
- Peters, M. F., Grant, V. H., Determination of optimum voltage for airplane electric systems. J 23, 485 (1939) RP1247.
- Peters, O. S.: Protection of life and property against lightning. T 6, (1915-16) T56.
- Ground connections for electrical systems. T 10, (1917-18) T108.
- Peters, O. S., McCollum, B.: Surface insulation of pipes as a means of preventing electrolysis. T 2, (1912-14) T15.
- A new electrical telemeter. T 17, 737 (1923-24) T247.
- Peters, O. S., Rosa, E. B., McCollum, B., Electrolysis in concrete. T 2, (1912-14) T18.
- Petersen, P. H., Properties of a porous concrete of cement and uniform-sized gravel. BMS96 (1943).
- Petersen, P. H., Fishburn, C. C., Effect of heating and cooling on the permeability of masonry walls. BMS41 (1940).
- Petersen, P. H., Fishburn, C. C., Parsons, D. E., Effect of outdoor exposure on the water permeability of masonry walls. BMS76 (1941).
- Petersen, P. H., Peck, M. F., Phelan, V. B., Dill, R. S., Structural, heat-transfer, and water-permeability properties of "Speedbrik" wall construction sponsored by the General Shale Products Corporation. BMS86 (1942).
- Petersen, A. A., French, H. J., Cross, H. C., Creep in five steels at different temperatures. T 22, 235 (1927-28) T362.
- Petersen, A. A., French, H. J., Kahlbaum, W., Flow characteristics of special Fe-Ni-Cr alloys and some steels at elevated temperatures. J 5, 125 (1930) RP192.
- Peterson, C., Cooter, I. L., Wenner, F., A vacuum-tube alternating-voltage compensator. J 25, 41 (1940) RP1312.
- Petrenko, S. N.: Comparative slow bend and impact notched bar tests on some metals. T 19, 315 (1924-25) T289.
- Relationships between the Rockwell and Brinell numbers. T 21, 195 (1926-27) T334.
- Comparative tests of six-inch cast-iron pipes of American and French manufacture. T 21, 231 (1926-27) T336.
- Relationships between Rockwell and Brinell numbers. J 5, 19 (1930) RP185.
- Petrenko, S. N., Larson, L. J., Loading test of a hollow tile and reinforced concrete floor of Arlington Building, Washington, D. C. T 17, 297 (1922-24) T236.
- Petrenko, S. N., Ramberg, W., Wilson, B., Determination of the Brinell number of metals. J 17, 59 (1936) RP903.
- Petrenko, S. N., Tuckerman, L. B., Whittemore, H. L., A new dead-weight testing machine of 100,000 pounds capacity. J 4, 261 (1930) RP147.
- Petrenko, S. N., Whittemore, H. L., Friction and carrying capacity of ball and roller bearings. T 15, (1921) T201.
- Pettijohn, E., Cain, J. R.: Oxygen content by the Ledebur method of acid Bessemer steels deoxidized in various ways. S 15, 259 (1919-20) S346.
- A critical study of the Ledebur method for determining oxygen in iron and steel. T 11, (1918-19) T113.
- A study of the Goutal method for determining carbon monoxide and carbon dioxide in steels. T 12, (1919) T126.
- Phelan, V. B., Care and repair of the house. BH15 (1931).
- Phelan, V. B., Hoback, W. G., Weiss, H. L., Structural properties of "Precision-Built, Jr." (second construction) prefabricated wood-frame wall construction sponsored by the Homasote Co. BMS89 (1942).
- Phelan, V. B., Peck, M. F., Dill, R. S., Petersen, P. H., Structural, heat-transfer, and water-permeability properties of "Speedbrik" wall construction sponsored by the General Shale Products Corporation. BMS86 (1942).
- Phelan, V. B., Peck, M. F., Hoback, W. G., Winslow, C. P., Structural properties of "PHC" prefabricated wood-frame constructions for walls, floors, and roofs sponsored by the PHC Housing Corporation. BMS90 (1942).

- Phelan, V. B., Wexler, A., Newman, S. B., Structural properties of prefabricated plywood light-weight construction for walls, partitions, floors, and roofs sponsored by the Douglas Fir Plywood Association. BMS104 (1945).
- Phelan, V. B., Whittemore, H. L., Cotter, J. B., Stang, A. H., Strength of houses: application of engineering principles to structural design. BMS109 (1947).
- Phelan, V. B., Whittemore, H. L., Dill, R. S., Lufford, R. F., Structural and heat-transfer properties of "Multiple Box-Girder Plywood Panels" for walls, floors, and roofs sponsored by Loren H. Wittner. BMS99 (1943).
- Phelan, V. B., Whittemore, H. L., Stang, A. H.: Structural properties of the Insulated Steel Construction Company's "frameless-steel" constructions for walls, partitions, floors, and roofs. BMS9 (1938).
- Structural properties of the Curren Fabrihome Corporation's "Fabrihome" constructions for walls and partitions. BMS11 (1938).
- Structural properties of "Steelox" constructions for walls, partitions, floors, and roofs sponsored by Steel Buildings, Inc., BMS12 (1939).
- Structural properties of "Wheeling Long-Span Steel Floor" construction sponsored by the Wheeling Corrugating Company. BMS15 (1939).
- Structural properties of "Pre-Fab" constructions for walls, partitions and floors sponsored by the Harnischfeger Corporation. BMS18 (1939).
- Structural properties of "Bender Steel Home" wall construction sponsored by The Bender Body Company. BMS27 (1939).
- Structural properties of "Scot-Bilt" prefabricated sheet steel constructions for walls, floors, and roofs sponsored by the Globe Wernicke Co., BMS46 (1940).
- Structural properties of "Mu-Steel" prefabricated sheet-steel constructions for walls, partitions, floors, and roofs sponsored by Herman A. Mugler. BMS67 (1941).
- Phelan, V. B., Whittemore, H. L., Stang, A. H., Dill, R. S., Structural and heat-transfer properties of "U. S. S. Panelbilt" prefabricated sheet-steel constructions for walls, partitions, and roofs sponsored by the Tennessee Coal, Iron & Railroad Co. BMS74 (1941).
- Phelps, F. P., Bates, F.: Influence of atmospheric conditions in the testing of sugars. B 10, 537 (1914) S221.
- A suggested new base point on the thermometric scale and the $\alpha \rightleftharpoons \beta$ inversion of quartz. S 22, 315 (1927-28) S557.
- The French Sugar Scale. J 17, 347 (1936) RP916.
- Phelps, F. P., Brewster, J. F., The preparation of optically stable sugar solutions for colorimetric analysis. J 10, 365 (1933) RP536.
- Phelps, F. P., Peters, H. H.: Color in the sugar industry. I. Color nomenclature in the sugar industry. II. Colorimetric clarification of turbid sugar solutions. T 21, 261 (1926-27) T338.
- A technical method of using the mercury arc to obtain data at wave length 560 m μ in the spectrophotometric analysis of sugar products. J 2, 335 (1929) RP38.
- Phelps, F. P., Purves, C. B., The structure of α methylxyloside. J 3, 247 (1929) RP93.
- Phillips, A. J., Bates, P. H., Wig, R. J., Action of the salts in alkali water and sea water on cements. T 2, (1912-14) T12.
- Phillips, A. J., Klein, A. A., Hydration of portland cement. T 5, (1914-15) T43.
- Phillips, T. D.: Effect of ceiling insulation upon summer comfort. BMS52 (1940).
- A survey of humidities in residences. BMS56 (1940).
- Pickering, S. F.: A review of the literature relating to the critical constants of various gases. S 21, 597 (1926-27) S541.
- Relations between the temperatures, pressures, and densities of gases. C279 (1925).
- Compressibilities of gases. M71 (1925).
- Pickering, S. F., Blanchard, M. S., A review of the literature relating to the normal densities of gases. S 21, 141 (1926-27) S529.
- Pickering, S. F., Edwards, J. D., Permeability of rubber to gases. S 16, 327 (1920) S387.
- Pickering, S. F., Shepherd, M., Weaver, E. R., Preparation of oxygen of high purity. J 22, 301 (1939) RP1182.
- Pickering, S. F., Smith, F. A.: Bunsen flames of unusual structure. J 3, 65 (1929) RP84.
- Measurements of flame velocity by a modified burner method. J 17, 7 (1936) RP900.
- Pienkowsky, A. T., Short tests for sets of laboratory weights. S 21, 65 (1926-27) S527.
- Pigman, G. L., Hornibrook, F. B., Rogers, J. S., A portable apparatus for measuring vibration in fresh concrete. J 20, 707 (1938) RP1101.
- Pigman, G. L., Swenson, J. A., Wagner, L. A., Effect of granulometric composition of cement on the properties of pastes, mortars, and concretes. J 14, 419 (1935) RP777.
- Pigman, G. L., Tucker, Jr., J., Pisapia, E. A., Rogers, J. S., Study of vibrated concrete. J 19, 575 (1937) RP1048.
- Pigman, W. W.: Improvements in the preparation of d-galacturonic acid. J 25, 301 (1940) RP1325.
- Action of almond emulsin on the phenyl glycosides of synthetic sugars and on B-thiophenyl d-glucoside. J 26, 197 (1941) RP1369.
- Enzymatic hydrolysis of disaccharides and halogenosaccharins. J 27, 1 (1941) RP1398.
- Occurrence of sucrose and inulin-hydrolyzing enzymes in commercial enzyme preparations. J 30, 159 (1943) RP1526.
- Classification of carbohydrases. J 30, 257 (1943) RP1531.
- Extent of hydrolysis of starches by amylases in the presence and absence of yeast. J 33, 105 (1944) RP1599.
- Optical rotation as an indication of aromatic substituent influences and intramolecular interaction. J 33, 129 (1944) RP1601.
- Pigman, W. W., Isbell, H. S.: The oxidation of alpha and beta glucose and a study of the isomeric forms of the sugar in solution. J 10, 337 (1933) RP534.
- Note on the thermal mutarotation of d-galactose, l-arabinose, and d-talose. J 16, 553 (1936) RP892.
- Bromine oxidation and mutarotation measurements of the alpha- and beta-aldoses. J 18, 141 (1937) RP969.
- α -d-Talose and d-talose acetates and orthoesters. J 19, 189 (1937) RP1021.
- Mutarotation of l-sorbose. J 19, 443 (1937) RP1035.
- Pyranose-furanose interconversions with reference to the mutarotations of galactose, levulose, lactulose, and turanose. J 20, 773 (1938) RP1104.
- Preparation and properties of β -d-2-desoxygalactose. J 22, 397 (1939) RP1190.
- Optical rotatory relationships exhibited by aromatic and aliphatic glycosides. J 27, 9 (1941) RP1399.
- Pigman, W. W., Isbell, H. S., Frush, H. L., Reducing powers of various sugars with alkaline cupric citrate reagent. J 24, 241 (1940) RP1282.
- Pignocco, J. M., Taylor, W. J., Rossini, F. D., Method for calculating the properties of hydrocarbons and its application to the refractive indices, densities, and boiling points of the paraffin and monoolefin hydrocarbons. J 34, 413 (1945) RP1651.
- Pignocco, J. M., Willingham, C. B., Taylor, W. J., Rossini, F. D., Vapor pressures and boiling points of some paraffin, alkylcyclopentane, alkylcyclohexane, and alkylbenzene hydrocarbons. J 35, 219 (1945) RP1670.
- Pinching, G. D., Bates, R. G., Purification of sodium chloride and potassium chloride for use in electrochemical work, and the determination of small amounts of bromide. J 37, 311 (1946) RP1749.
- Pinching, G. D., Hamer, W. J., Acree, S. F.: pH values of acid-salt mixtures of some aromatic sulfonic acids at various temperatures and a criterion of completeness of dissociation. J 31, 201 (1943) RP1567.

- Pinching, G. D., Hamer, W. J., Acree, S. F.:* First dissociation constant of *o*-phthalic acid and related pH values of phthalate buffers from 0° to 60° C. *J 35*, 539 (1945) RP1687.
- pH standards at various temperatures:* aqueous solutions of acid potassium phthalate. *J 36*, 47 (1946) RP1690.
- Pisapia, E. A., Schuman, L.:* Behavior of high-strength cement concretes and mortars under various temperature and humidity conditions. *J 14*, 723 (1935) RP799.
- Pisapia, E. A., Tucker, Jr., J., Pigman, G. L., Rogers, J. S.:* Study of vibrated concrete. *J 19*, 575 (1937) RP1048.
- Pitzer, K. S., Kilpatrick, J. E.:* Heat content, free-energy function, entropy, and heat capacity of ethylene, propylene, and the four butenes, to 1,500° K. *J 37*, 163 (1946) RP1738.
- Normal coordinate analysis of the vibrational frequencies of ethylene, propylene, cis-2-butene, trans-2-butene, and isobutene.* *J 38*, 191 (1947) RP1768.
- Pitzer, K. S., Kilpatrick, J. E., Prosen, E. J., Rossini, F. D.:* Heats, equilibrium constants, and free energies of formation of the monoolefin hydrocarbons. *J 36*, 559 (1946) RP1722.
- Pitzer, K. S., Prosen, E. J., Rossini, F. D.:* Free energies and equilibria of isomerization of the 18 octanes. *J 34*, 255 (1945) RP1641.
- Heats and free energies of formation of the paraffin hydrocarbons, in the gaseous state to 1,500° K.* *J 34*, 403 (1945) RP1650.
- Pitzer, K. S., Rossini, F. D., Prosen, E. J. R.:* Free energies and equilibria of isomerization of the butanes, pentanes, hexanes, and heptanes. *J 27*, 529 (1941) RP1440.
- Pitzer, K. S., Rossini, F. D., Taylor, W. J., Kilpatrick, J. E., Ebert, J. P., Beckett, C. W., Williams, M. G., Werner, H. G.:* Tables of selected values of hydrocarbons. C461 (1947).
- Pitzer, K. S., Rossini, F. D., Taylor, W. J., Wagman, D. D., Williams, M. G.:* Heats, equilibrium constants, and free energies of formation of the alkylbenzenes. *J 37*, 95 (1946) RP1732.
- Pitzer, K. S., Taylor, W. J.:* The vibrational frequencies of semirigid molecules: A general method and values for ethylbenzene. *J 33*, 1 (1947) RP1758.
- Pitzer, K. S., Wagman, D. D., Kilpatrick, J. E., Rossini, F. D.:* Heats, equilibrium constants, and free energies of formation of the acetylene hydrocarbons through the pentyne to 1,500° K. *J 35*, 467 (1945) RP1682.
- Pitzer, K. S., Wagman, D. D., Kilpatrick, J. E., Taylor, W. J., Rossini, F. D.:* Heats, free energies, and equilibrium constants of some reactions involving O₂, H₂, H₂O, C, CO, CO₂, and CH₄. *J 34*, 143 (1945) RP1634.
- Plitt, T. M.:* Microscopic methods used in identifying commercial fibers. C423 (1939).
- Plyler, E. K., Humphreys, C. J.:* Infrared emission of spectra of krypton and argon. *J 38*, 499 (1947) RP1790.
- Plyler, E. K., Stair, R., Humphreys, C. J.:* Infrared absorption spectra of twelve cyclopentanes and cyclohexanes. *J 38*, 211 (1947) RP1769.
- Pole, G. R., Schurecht, H. G.:* Effect of water on expansions of ceramic bodies of different composition. *J 3*, 331 (1929) RP98.
- Method of measuring strains between glazes and ceramic bodies.* *J 5*, 97 (1930) RP189.
- Moisture expansion of glazes and other ceramic finishes.* *J 6*, 457 (1931) RP288.
- Pollard, R. E.:* Stress-corrosion tests of bridgeable wire. *J 33*, 201 (1944) RP1604.
- Pollard, R. E., Jager, R. E.:* U. S. patents on powder metallurgy. M184 (1947).
- Pollard, R. E., Porter, W. C.:* Methods of investigation of surface treatment for corrosion protection of steel. BMS8 (1938).
- Surface treatment of steel prior to painting.* BMS44 (1940).
- Pollard, R. E., Reinhart, F. M.:* Relief of residual stress in streamline tie rods. *J 28*, 755 (1942) RP1477.
- Pomerantz, P., Brooks, D. B., Howard, F. L., Mears, T. W., Fookson, A.:* Preparation and physical properties of several aliphatic hydrocarbons and intermediates. *J 38*, 365 (1947) RP1779.
- Porter, J. M.:* The technology of the manufacture of gypsum products. C281 (1926).
- Porter, J. M., Emley, W. E.:* Manufacture of lime. C337 (1927).
- Porter, J. W., Schiefer, H. F., Cleveland, R. S., Miller, J.:* Effect of weave on the properties of cloth. *J 11*, 441 (1933) RP600.
- Porter, J. W., Schiefer, H. F., Taft, D. H.:* Effect of number of warp and filling yarns per inch and some other elements of construction on the properties of cloth. *J 16*, 139 (1936) RP862.
- Porter, W. C., Painting Steel.* BMS102 (1944).
- Porter, W. C., Pollard, R. E.:* Methods of investigation of surface treatment for corrosion protection of steel. BMS8 (1938).
- Surface treatment of steel prior to painting.* BMS44 (1940).
- Prather, J. L., Ferguson, W. J., Rands, Jr., R. D.:* Specific heat and increases of entropy and enthalpy of the synthetic rubber GR-S from 0° to 330° K. *J 33*, 63 (1944) RP1595.
- Pratt, H., Diamond, H.:* Receiving sets for aircraft beacon and telephony. *J 1*, 543 (1928) RP19.
- Pressler, E. E., Shearer, W. L.:* Properties of potter's flints and their effects in white-ware bodies. *T 20*, 289 (1925-26) T310.
- Preston, J. L., Dellinger, J. H.:* Methods of measurement of properties of electrical insulating materials. *S 19*, 39 (1923-24) S471.
- Properties of electrical insulating materials of the laminated phenolmethylenes type.* *T 16*, 501 (1921-22) T216.
- Preston, J. L., Hall, E. L.:* A study of the seasonal variation of radio-frequency phase difference of laminated phenolic insulating materials. *T 19*, 225 (1924-25) T284.
- Preston, J. L., Horle, L. C. F.:* Some methods of testing radio receiving sets. *T 18*, 203 (1924-25) T256.
- Price, M., Krynski, A.:* Fineness test of molding sand. *J 36*, 521 (1946) RP1720.
- Priest, I. G.:* A new method for determining the focal length of a converging lens. *B 5*, 483 (1908-09) S110.
- A modified method for the determination of relative wave-lengths.* *B 6*, 573 (1909-10) S142.
- Wave lengths of neon.* *B 8*, 539 (1912) S179.
- A simplified formula for the change in order of interference due to changes in temperature and pressure of air.* *B 9*, 479 (1913) S199.
- A new interferential dilatometer.* *S 15*, 669 (1919-20) S365.
- The spectral distribution of energy required to evoke the gray sensation.* *S 17*, 231 (1922) S417.
- Measurement of the color temperature of the more efficient artificial light sources by the method of rotary dispersion.* *S 18*, 221 (1922-23) S443.
- The Priest-Lange reflectometer applied to nearly white porcelain enamels.* *J 15*, 529 (1935) RP847.
- Priest, I. G., Brickwedde, F. G., [Judd, D. B.]:* Minimum perceptible colorimetric purity as a function of dominant wave length. *J 20*, 673 (1938) RP1099.
- Priest, I. G., Gibson, K. S., Harris, F. K.:* Lovibond color system. I. A spectrophotometric analysis of the Lovibond glasses. *Sci. BS*, 22, 1 (1927-28) S547.
- Priest, I. G., Gibson, K. S., McNicholas, H. J.:* An examination of the Munsell Color System. I. Spectral and total reflection and the Munsell scale of value. *T 13*, (1919-20) T167.
- Priest, I. G., Judd, D. B., Gibson, K. S., Walker, G. K.:* Calibration of sixty-five 35-yellow Lovibond glasses. *J 2*, 793 (1929) RP58.
- Priest, I. G., Meggers, W. F., Gibson, K. S., Tyndall, E. P. T., McNicholas, H. J.:* The color and spectral composition of certain high-intensity searchlight arcs. *T 13*, (1919-20) T168.
- Priest, I. G., Peters, C. G.:* Measurement and specification of the physical factors which determine the saturation of certain tints of yellow. *T 9*, (1916-17) T92.
- Proffitt, M. J.:* Design and construction of an experimental diffusion battery. *J 15*, 441 (1935) RP840.

- A flow manostat for various purposes, including the candy test. J 29, 143 (1942) RP1492.
- Proffitt, M. J., Bogan, J. A., Jackson, R. F.: Dimensions of jerusalem-artichoke cossettes. J 17, 615 (1936) RP931.
- Extraction of jerusalem-artichoke juices in an experimental diffusion battery. J 19, 263 (1937) RP1025.
- Proffitt, M. J., Jackson, R. F., Silsbee, C. G.: The preparation of levulose. S 20, 587 (1924-26) S519.
- Prosen, E. J., Gilmont, R., Rossini, F. D.: Heats of combustion of benzene, toluene, ethylbenzene, o-xylene, m-xylene, p-xylene, n-propylbenzene, and styrene. J 34, 65 (1945) RP1629.
- Prosen, E. J. R., Rossini, F. D.: Heats of isomerization of the five hexanes. J 27, 289 (1941) RP1420.
- Heats of isomerization of the nine heptanes. J 27, 519 (1941) RP1439.
- Heats of combustion of eight normal paraffin hydrocarbons in the liquid state. J 33, 255 (1944) RP1607.
- Some experimental data on the heats of combustion of benzoic acid and carbon (graphite). J 33, 439 (1944) RP1619.
- Heats of formation and combustion of 1,3-butadiene and styrene. J 34, 59 (1945) RP1628.
- Heats of isomerization of the 18 octanes. J 34, 163 (1945) RP1635.
- Heats of combustion and formation of the paraffin hydrocarbons at 25° C. J 34, 263 (1945) RP1642.
- Heats of formation, hydrogenation, and combustion of the monoolefin hydrocarbons through the hexenes, and of the higher l-alkenes, in the gaseous state at 25° C. J 36, 269 (1946) RP1702.
- Prosen, E. J. R., Rossini, F. D., Pitzer, K. S.: Free energies and equilibria of isomerization of the butanes, pentanes, hexanes, and heptanes. J 27, 529 (1941) RP1440.
- Prosen, E. J., Jessup, R. S., Rossini, F. D.: Heat of formation of carbon dioxide and of the transition of graphite into diamond. J 33, 447 (1944) RP1620.
- Prosen, E. J., Johnson, W. H., Rossini, F. D.: Heats of combustion and isomerization of the eight C₈H₁₈ alkylbenzenes. J 35, 141 (1945) RP1665.
- Heats of combustion and formation at 25° C of the alkylbenzenes through C₁₀H₁₄ and of the higher normal monoalkylbenzenes. J 36, 455 (1946) RP1714.
- Heats of combustion of four cyclopentane and five cyclohexane hydrocarbons. J 36, 463 (1946) RP1715.
- Heats of formation and combustion of the normal alkylcyclopentanes and cyclohexanes and the increment per CH₂ group for several homologous series of hydrocarbons. J 37, 51 (1946) RP1728.
- Heats of combustion and isomerization of six nonanes. J 38, 419 (1947) RP1783.
- Prosen, E. J., Kilpatrick, J. E., Pitzer, K. S., Rossini, F. D.: Heats, equilibrium constants, and free energies of formation of the monoolefin hydrocarbons. J 36, 559 (1946) RP1722.
- Prosen, E. J., Pitzer, K. S., Rossini, F. D.: Free energies and equilibria of isomerization of the 18 octanes. J 34, 255 (1945) RP1641.
- Heats and free energies of formation of the paraffin hydrocarbons, in the gaseous state, to 1,500° K. J 34, 403 (1945) RP1650.
- Puckett, A. D.: Knock ratings of gasoline substitutes. J 35, 273 (1945) RP1673.
- Purington, E. S.: Operation of the modulator tube in radio telephone sets. S 17, 377 (1922) S423.
- Purves, C. B., Phelps, F. P.: The structure of α-methylxyloside. J 3, 247 (1929) RP93.
- Querfeld, D. W., Bridgeman, O. C.: Critical solution temperatures of mixtures of gasoline, ethyl alcohol, and water. J 10, 693 (1933) RP560.
- The effect of gasoline volatility on the miscibility with ethyl alcohol. J 10, 841 (1933) RP571.
- Quick, G. W.: Tensile properties of rail steels at elevated temperatures. J 8, 173 (1932) RP403.
- The resistance to impact of rail steels at elevated temperatures. J 8, 191 (1932) RP409.
- Atmospheric exposure tests on nonferrous screen wire cloth. J 14, 775 (1935) RP803.
- Service-test results of titanium-treated and silicon-treated steel rails. J 19, 531 (1937) RP1042.
- Quick, G. W., Burgess, G. K.: Thermal stresses in steel car wheels. T 17, 367 (1922-24) T235.
- A comparison of the deoxidation effects of titanium and silicon on the properties of rail steel. T 17, 581 (1922-24) T241.
- Quick, G. W., Freeman, Jr., J. R.: Tensile properties of rail and some other steels at elevated temperatures. J 4, 549 (1930) RP164.

R

- Ramberg, W.: Vacuum-tube acceleration pick-up. J 37, 391 (1946) RP1754.
- Ramberg, W., Aitchison, C. S., Tuckerman, L. B., Whittemore, H. L.: Tensile and compressive properties of some stainless steel sheets. J 28, 499 (1942) RP1467.
- Ramberg, W., Bailly, P. S., West, M. J.: A method for determining stresses in a nonrotating propeller blade vibrating with a natural frequency. J 14, 189 (1935) RP764.
- Ramberg, W., Levy, S.: Calculation of stresses and natural frequencies for a rotating propeller blade vibrating flexurally. J 21, 639 (1938) RP1148.
- Ramberg, W., Petrenko, S. N., Wilson, B.: Determination of the Brinell number of metals. J 17, 59 (1936) RP903.
- Ramsay, R. C., Hock, C. W., Harris, M.: Microscopic structure of the cotton fiber. J 26, 93 (1941) RP1362.
- Microscopic structure of the wool fiber. J 27, 181 (1941) RP1412.
- Randall, C. R.: Ultrasonic measurements of the compressibility of solutions and of solid particles in suspension. J 8, 79 (1932) RP402.
- Randolph, D. W., Silsbee, F. B.: Linkage-current diagram for representing magneto operation. S 21, 647 (1926-27) S543.
- Rands, Jr., R. D., Ferguson, W. J., Prather, J. L.: Specific heat and increases of entropy and enthalpy of the synthetic rubber GR-S from 0° to 330° K. J 33, 63 (1944) RP1595.
- Rands, Jr., R. D., Scott, R. B., Meyers, C. H., Brickwedde, F. G., Bekkedahl, N.: Thermodynamic properties of 1,3-butadiene in the solid, liquid, and vapor states. J 35, 39 (1945) RP1661.
- Rapp, P.: Effect of calcium chloride on portland cements and concretes. J 14, 499 (1935) RP782.
- Rapp, P., Bates, P. H., Young, R. N.: Tests of caustic magnesia made from magnesite from several sources. T 17, 529 (1922-24) T239.
- Rapuzzi, A. E.: Directory of commercial testing and college research laboratories. M90 (2nd ed.), (1927).
- Directory of commercial testing and college research laboratories. M125 (1936).
- Directory of commercial and college laboratories. M187 (1947).
- Rapuzzi, A. E., Cooley, P. A.: National directory of commodity specifications. M178 (1945).
- Rasch, R. H.: A study of purified wood fibers as a paper-making material. J 3, 469 (1929) RP107.
- Accelerated aging test for paper. J 7, 465 (1931) RP352.
- Rasch, R. H., Burton, J. O.: The determination of the alpha cellulose content and copper number of paper. J 6, 603 (1931) RP295.
- Rasch, R. H., Scribner, B. W.: Comparison of natural aging of paper with accelerated aging by heating. J 11, 727 (1933) RP620.

Q

- Quayle, P. P.: Spark photography and its application to some problems in ballistics. S 20, 237 (1924-26) S508.
- Quayle, P. P., Eckhardt, E. A., Chrisler, V. L., Evans, M. J., Buckingham, E.: Transmission of sound through voice tubes. T 21, 163 (1926-27) T333.

- Rasch, R. H., Shaw, M. B., Bicking, G. W.: Highly purified wood fibers as paper-making material. J 7, 765 (1931) RP372.
- A study of some factors influencing the strength and stability of experimental papers made from two different sulphite pulps. J 11, 7 (1933) RP574.
- Rawdon, H. S.: The intercrystalline brittleness of lead. S 16, 215 (1920) S377.
- Use of ammonium persulphate for revealing the microstructure of iron and steel. S 16, 715 (1920) S402.
- The microstructure of changes accompanying the annealing of cast bronze (Cu 88, Sn 10, Zn 2). T 6, (1915-16) T60.
- Some unusual features in the microstructure of wrought iron. T 9, (1916-17) T97.
- Typical cases of the deterioration of Muntz Metal (60:40 brass) by selective corrosion T 10, (1917-18) T103.
- Strain markings in mild steel under tension. J 1, 467 (1928) RP15.
- Laboratory corrosion tests of mild steel, with special reference to ship plate. J 2, 431 (1929) RP42.
- The structure and related properties of metals. C113 (1st ed.), (1921).
- The structure and related properties of metals. C113 (2nd ed.), (1922).
- Rawdon, H. S., Berglund, T., Unusual features in the microstructure of ferrite. S 22, 649 (1927-28) S571.
- Rawdon, H. S., Burgess, G. K., Crowe, J. J., Wallenberg, R. G., Observations on finishing temperatures and properties of rails. T 4, (1913-14) T38.
- Rawdon, H. S., Epstein, S.: The structure of martensitic carbon steels and the changes in microstructure which occur upon tempering. S 18, 373 (1922-23) S452.
- Metallographic features revealed by the deep etching of steel. T 13 (1919-20) T156.
- The nick-bend test for wrought iron. T 18, 115 (1924-25) T252.
- Steel for casehardening — normal and abnormal steel. J 1, 423 (1928) RP14.
- Rawdon, H. S., Groesbeck, E. C., Effect of the testing method on the determination of corrosion resistance. T 22, 409 (1927-28) T367.
- Rawdon, H. S., Groesbeck, E. C., Jordan, L., Electric-arc welding of steel: I. Properties of the arc-welded metal. T 14, (1920-21) T179.
- Rawdon, H. S., Jimeno-Gil, E., A study of the relation between the Brinell hardness and the grain size of annealed carbon steels. S 16, 557 (1920) S397.
- Rawdon, H. S., Karr, C. P., Standard test specimens of zinc bronze (Cu 88, Sn 10, Zn 2) — Parts I and II. T 6, (1915-16) T59.
- Rawdon, H. S., Knight, O. A., Comparative properties of wrought iron made by hand puddling and by the Aston process. J 3, 953 (1929) RP124.
- Rawdon, H. S., Krymizky, A. I., A study of the deterioration of nickel spark-plug electrodes in service. T 13, (1919-20) T143.
- Rawdon, H. S., Langdon, S. C., A peculiar type of intercrystalline brittleness of copper. T 13, (1919-20) T158.
- Rawdon, H. S., Lorentz, M. G.: Metallographic etching reagents: I. For copper. S 16, 641 (1920) S399.
- Metallographic etching reagents: II. For copper alloys, nickel, and the alpha alloys of nickel. S 17, 635 (1922) S435.
- Rawdon, H. S., Scott, H., Notes on the microstructure of iron and mild steel at high temperatures. S 15, 519 (1919-20) S356.
- Rawdon, H. S., Sillers, Jr., F., Preparation and properties of pure iron alloys: III. Effect of manganese on the structure of alloys of the iron-carbon system. S 18, 637 (1922-23) S464.
- Rawdon, H. S., Tucker, W. A., Effect of oxidizing conditions on accelerated electrolytic corrosion tests. J 3, 375 (1929) RP101.
- Redmond, J. C., The precipitation and titration of magnesium oxyquinolate in the presence of calcium oxalate, and its application in the analysis of portland cement and similar silicates. J 10, 823 (1933) RP569.
- Redmond, J. C., Bright, H. A., Determination of magnesium in Portland cement and similar materials by the use of 8-hydroxyquinoline. J 6, 113 (1931) RP265.
- Reed, R. F., Appel, W. D., Light fastness of lithographic ink pigments. J 3, 359 (1929) RP100.
- Reese, R. M., Dibeler, V. H., Mohler, F. L., Mass spectrometer study of rare gases. J 33, 617 (1947) RP1799.
- Reichel, R. C., Weber, C. G.: Accumulation of moisture in walls of frame construction during winter exposure. BMS93 (1942).
- Experimental dry-wall construction with fiber insulating board. BMS97 (1943).
- Reid, C. E., Rosa, E. B., Lloyd, M. G., Influence of wave form on the rate of integrating induction wattmeters. B 1, 421 (1904-05) S21.
- Reid, Jr., J. G., Brewer, A. K., Madorsky, S. L., Taylor, J. K., Dibeler, V. H., Bradt, P., Parham, O. L., Britten, R. J., Concentration of isotopes of potassium by the counter-current electromigration method. J 38, 137 (1947) RP1765.
- Reimann, G., Judd, D. B., Keegan, H. J., Spectrophotometric and colorimetric determination of the TCCA standard color card. J 36, 209 (1946) RP1700.
- Reinecker, H. P., Danielson, R. R., Wet-process enamels for cast iron. T 17, 695 (1922-24) T246.
- Reinhart, F. W., Kronstadt, R. A., Kline, G. M., Antiscatter treatments for glass. M175 (1944).
- Reinhart, F. M., Pollard, R. E., Relief of residual stress in streamline tie rods. J 28, 755 (1942) RP1477.
- Reinhart, F. W., Rinker, R. C., De Lollis, N. J., Kline, G. M., Effect of catalysts and pH on strength of resin-bonded plywood. J 37, 281 (1946) RP1748.
- Reinicker, C. E., McBride, R. S., Gas-mantle lighting conditions in ten large cities in the United States. T 9, (1916-17) T99.
- Reinicker, C. E., McBride, R. S., Dunkley, W. A., Toluol recovery. T 11, (1918-19) T117.
- Reymer, S. E., Gilliland, T. R., Kirby, S. S., Smith, N.: Characteristics of the ionosphere and their application to radio transmission. J 18, 645 (1937) RP1001.
- Maximum usable frequencies for radio sky-wave transmission, 1933 to 1937. J 20, 627 (1938) RP1096.
- Reymer, S. E., Norton, K. A., A continuous recorder of radio field intensities. J 11, 373 (1933) RP597.
- Richard, F. E., Tests of the effect of brackets in reinforced concrete rigid frames. J 1, 189 (1928) RP9.
- Richard, F. E., Slater, W. A., Scofield, G. G., Tests of bond resistance between concrete and steel. T 14, (1920-21) T173.
- Richmond, J. C., Harrison, W. N., Moore, D. G., Ceramic coatings for high-temperature protection of steel. J 38, 293 (1947) RP1773.
- Richmond, J. C., McBurney, J. W., Strength, absorption, and resistance to laboratory freezing and thawing of building bricks produced in the United States. BMS60 (1940).
- Richmyer, F. K., Crittenden, E. C., An "average eye" for heterochromatic photometry, and comparison of a flicker and an equality-of-brightness photometer. B 14, 87 (1918-19) S299.
- Riddell, G. E., Brenner, A., Nickel plating on steel by chemical reduction. J 37, 31 (1946) RP1725.
- Rinker, R. C., De Lollis, N. J., Kline, G. M., Reinhart, F. W., Effect of catalysts and pH on strength of resin-bonded plywood. J 37, 281 (1946) RP1748.
- Ritchie, L. M., Holler, H. D., Relation of voltage of dry cells to hydrogen-ion concentration. S 15, 659 (1919-20) S364.
- Ritchie, L. M., Vinal, G. W.: Automatic apparatus for intermittent testing. T 14, (1920-21) T171.
- A new method for determining the rate of sulphation of storage-battery plates. T 17, 117 (1922-24) T225.
- Rivlin, R. S., Torsion of a rubber cylinder. J 38, 637 (1947) RP1802.
- Roberts, D. E., Walton, W. W., Jessup, R. S., Heats of combustion and solution of liquid styrene and solid polystyrene and the heat of polymerization of styrene. J 38, 627 (1947) RP1801.

- Robinson, H. E., Dill, R. S., Robinson, W. C., Measurement of heat losses from slab doors. BMS103 (1945).
- Robinson, W. C., Dill, R. S., Robinson, H. E., Measurement of heat losses from slab doors. BMS103 (1945).
- Robinson, W. C., Ingberg, S. H., Griffin, H. K., Wilson, R. E., Fire tests of building columns. T 15, (1921) T184.
- Rodden, C. J.:
Colorimetric determination of arsenic in ferrous and nonferrous alloys. J 24, 7 (1940) RP1267.
Spectrophotometric determination of praseodymium, neodymium, and samarium. J 26, 557 (1941) RP1395.
Spectrophotometric determination of dysprosium, holmium, erbium, thulium, and ytterbium. J 28, 265 (1942) RP1456.
- Rodden, C. J., Smith, E. R., Effects of methionine, djenkolic acid, and benzylcysteine on the estimation of cystine by the dropping mercury cathode. J 22, 669 (1939) RP1211
- Rodman, J. A., Joliffe, C. B., A quantitative study of regeneration by inductive feed back. S 19, 419 (1923-24) S487.
- Roeser, H. M.:
Calculations of constants of Planck's radiation equation: Application of theory of least squares. B 14, 237 (1918-19) S304.
Adjustment of parabolic and linear curves to observations taken at equal intervals of the independent variable. S 16, 363 (1920) S388.
- Roeser, W. F.:
Thermoelectric temperature scales. J 3, 343 (1929) RP99.
The passage of gas through the walls of pyrometer protection tubes at high temperatures. J 7, 485 (1931) RP354.
- Roeser, W. F., Caldwell, F. R., Wensel, H. T., The freezing point of platinum. J 6, 1119 (1931) RP326.
- Roeser, W. F., Dahl, A. I.:
Conditions affecting the freezing temperature of silver. J 10, 661 (1933) RP557.
Reference tables for iron-constantan and copper-constantan thermocouples. J 20, 337 (1938) RP1080.
- Roeser, W. F., Dahl, A. I., Gowens, G. J., Standard tables for chromel-alumel thermocouples. J 14, 239 (1935) RP767.
- Roeser, W. F., Hoffman, J. I., Freezing point of gallium. J 13, 673 (1934) RP735.
- Roeser, W. F., Mueller, E. F., Measurement of surface temperatures. J 5, 793 (1930) RP231.
- Roeser, W. F., Schofield, F. H., Moser, H. A., An international comparison of temperature scales between 660° and 1,063° C. J 11, 1 (1933) RP573.
- Roeser, W. F., Wensel, H. T.:
The freezing point of nickel as a fixed point on the International Temperature Scale. J 5, 1309 (1930) RP258.
Reference tables for platinum to platinum-rhodium thermocouples. J 10, 275 (1933) RP530.
Freezing point of rhodium. J 12, 519 (1934) RP766.
Methods of testing thermocouples and thermocouple materials. J 14, 247 (1935) RP768.
Freezing temperatures of high-purity iron and some steels. J 26, 273 (1941) RP1375.
- Roeser, W. F., Wensel, H. T., Barlow, L. E., Caldwell, F. R.
The Waidner-Burgess standard of light. J 6, 1103 (1931) RP325
Deviation of photometric standards for tungsten-filament lamps. J 13, 161 (1934) RP699.
- Roeser, W. F., Wensel, H. T., Judd, D. B., Establishment of a scale of color temperature. J 12, 527 (1934) RP677.
- Romanoff, M., Effect of aeration on hydrogen-ion concentration of soils in relation to identification of corrosive soils. J 34, 227 (1945) RP1639.
- Romanoff, M., Logan, K. H., Soil-corrosion studies, 1941: Ferrous and nonferrous corrosion-resistant materials and nonbituminous coatings. J 33, 145, (1944) RP1602.
- Rogers, B. A., Schoonover, I. C., Jordan, L., Silver: Its properties and industrial uses. C412 (1936).
- Rogers, J. S., Blaine, R. L., Investigation of commercial masonry cements. J 13, 811 (1934) RP746.
- Rogers, J. S., Pigman, G. L., Hornibrook, F. B., A portable apparatus for measuring vibration in fresh concrete. J 20, 707 (1938) RP1101.
- Rogers, J. S., Tucker, Jr., J., Pigman, G. L., Pisapia, E. A., Study of vibrated concrete. J 19, 575 (1937) RP1048.
- Rosa, E. B.:
Wattmeter methods of measuring power expended upon condensers and circuits of low power factor. B 1, 383 (1903-05) S18.
The Gray absolute electrodyneometer. B 2, 71 (1906) S28.
Calculation of the self-inductance of single-layer coils. B 2, 161 (1906) S31.
Revision of the formulae of Weinstein and Stefan for the mutual inductance of coaxial coils. B 2, 331 (1906) S41.
On the geometrical mean distances of rectangular areas and the calculation of self-inductance. B 3, 1 (1907) S47
The compensated two-circuit electrodyneometer. B 3, 43 (1907) S48.
The mutual inductance of a circle and a coaxial single-layer coil. The Lorenz apparatus and the Ayrton-Jones absolute electrodyneometer. B 3, 209 (1907) S56.
On the self-inductance of a toroidal coil of rectangular section. B 4, 141 (1907-08) S74.
The self and mutual inductance of linear conductors. B 4, 301 (1907-08) S80.
The self-inductance of a coil of any length and any number of layers of wire. B 4, 369 (1907-08) S83.
A new form of standard resistance. B 5, 413 (1908-09) S107.
A new method for the absolute measurement of resistance. B 5, 499 (1908-09) S111.
Photometric units and nomenclature. B 6, 543 (1909-10) S141.
- Rosa, E. B., Babcock, H. D., On the variation of resistances with atmospheric humidity. B 4, 121 (1907-08) S73.
- Rosa, E. B., Brooks, H. B., McCollum, B., Canada, W. J., Glading, F. W., Investigation of cartridge-inclosed fuses. T 8, (1916-17) T74.
- Rosa, E. B., Cohen, L.:
The mutual inductance of two circular coaxial coils of rectangular section. B 2, 359 (1906) S42.
The mutual inductance of coaxial solenoids. B 3, 305 (1907) S59.
On the self-inductance of circles. B 4, 149 (1907-08) S75.
Formulae and tables for the calculation of mutual and self-inductance. B 5, 1 (1908-09) S93.
- Rosa, E. B., Crittenden, E. C., Flame standards in photometry. B 10, 557 (1914) S222.
- Rosa, E. B., Dorsey, N. E.:
A new determination of the ratio of the electromagnetic to the electrostatic unit of electricity. B 3, 433 (1907) S65.
A comparison of the various methods of determining the ratio of the electromagnetic to the electrostatic unit of electricity. B 3, 605 (1907) S66.
- Rosa, E. B., Dorsey, N. E., Miller, J. M., A determination of the international ampere in absolute measure. B 8, 269 (1912) S171.
- Rosa, E. B., Grover, F. W.:
The absolute measurement of inductance. B 1, 125 (1903-05) S9.
The absolute measurement of capacity. B 1, 153 (1903-05) S10.
Measurement of inductance by Anderson's method, using alternating currents and a vibration galvanometer. B 1, 291 (1903-05) S14.
Use of serpentine in standards of inductance. B 1, 337 (1903-05) S15.
Formulas and tables for the calculation of mutual and self-inductance (Third edition, revised and enlarged). B 8, 1 (1912) S169.
- Rosa, E. B., Lloyd, M. G., The determination of the ratio of transformation and of the phase relations in transformers. B 6, 1 (1909-10) S116.
- Rosa, E. B., Lloyd, M. G., Reid, C. E., Influence of wave form on the rate of integrating induction wattmeters. B 1, 421 (1903-05) S21.

- Rosa, E. B., McBride, R. S.*, Legal specifications for illuminating gas. T 2, (1912-14) T14.
- Rosa, E. B., McCollum, B.*:
Special studies in electrolysis mitigation. I. A preliminary study of conditions in Springfield, Ohio, with recommendations for mitigation and control. T 3, (1911-16) T27.
Electrolysis and its mitigation. T 5, (1914-15) T52.
- Rosa, E. B., McCollum, B., Logan, K. H.*, Electrolysis from electric railway currents and its prevention: Experimental test on a system of insulated negative feeders in St. Louis. T 4, (1913-14) T32.
- Rosa, E. B., McCollum, B., Peters, O. S.*, Electrolysis in concrete. T 2, (1912-14) T18.
- Rosa, E. B., Taylor, A. H.*, Theory, construction, and use of the photometric integrating sphere. S 18, 281 (1922-23) S447.
- Rosa, E. B., Vinal, G. W.*:
The silver voltameter — Part I. First series of quantitative experiments. B 9, 151 (1913) S194.
Volume effect in the silver voltameter. B 13, 447 (1916-17) S283.
Summary of experiments on the silver voltameter at the Bureau of Standards and proposed specifications. B 13, 479 (1916-17) S285.
- Rosa, E. B., Vinal, G. W., McDaniel, A. S.*:
The silver voltameter — Part II. The chemistry of the filter-paper voltameter and the explanation of striations. B 9, 209 (1913) S195.
The silver voltameter — Part III. Second series of quantitative experiments and the preparation and testing of silver nitrate. B 9, 493 (1913) S201.
The silver voltameter — Part IV. Third series of quantitative experiments and special investigations. B 10, 475 (1914) S220.
- Rose, Jr., F. W.*:
Infrared absorption of nineteen hydrocarbons, including ten of high molecular weight. J 19, 143 (1937) RP1017.
Quantitative analysis, with respect to the component structural groups, of the infrared (1 to 2 μ) molar absorptive indices of 55 hydrocarbons. J 20, 129 (1938) RP1072.
- Rose, Jr., F. W., Mair, B. J., Schicklantz, S. T.*, Apparatus and methods for investigating the chemical constitution of lubricating oil, and preliminary fractionation of the lubricating oil fraction of a midcontinent petroleum. J 15, 557 (1935) RP849.
- Rose, Jr., F. W., White, J. D.*:
Isolation of normal nonane from a midcontinent petroleum. J 7, 907 (1931) RP383.
Isolation of the three xylenes from an Oklahoma petroleum. J 9, 711 (1932) RP501.
Isolation of ethylbenzene from an Oklahoma petroleum. J 10, 639 (1933) RP554.
Isolation of a nonanaphthene from an Oklahoma petroleum. J 13, 799 (1934) RP745.
Isolation of ethylcyclohexane from a midcontinent petroleum. J 15, 151 (1935) RP817.
Isolation of an isononane from petroleum — Its fractionation from naphthenes by distillation with acetic acid. J 17, 943 (1936) RP955.
Separation of isopropylbenzene from a midcontinent petroleum by adsorption with silica gel and distillation with acetic acid. J 21, 151 (1938) RP1122.
Separation, by distillation with acetic acid, of the aromatic hydrocarbons from the fraction of a midcontinent petroleum boiling between 154° and 162° C. J 21, 167 (1938) RP1123.
- Rose, Jr., F. W., White, J. D., Calingaert, G., Soroos, H.*, 2,6-Dimethylheptane: Its synthesis, properties, and comparison with an isononane from petroleum. J 22, 315 (1939) RP1184.
- Rosenberg, S. J.*:
The resistance of steels to abrasion by sand. J 5, 553 (1930) RP214.
The resistance to wear of carbon steels. J 7, 419 (1931) RP348.
Effect of low temperatures on the properties of aircraft metals. J 25, 673 (1940) RP1347.
- Rosenberg, S. J., Digges, T. G.*:
Effect of rate of heating through the transformation range on austenitic grain size. J 25, 215 (1940) RP1322.
- Influence of initial structure and rate of heating on the austenitic grain size of 0.5-percent-carbon steels and iron-carbon alloy. J 29, 33 (1942) RP1481.
- Metallographic study of the formation of austenite from aggregates of ferrite and cementite in an iron-carbon alloy of 0.5 percent carbon. J 29, 113 (1942) RP1489.
- Rosenberg, S. J., Freeman, Jr., J. R., Scherrer, J. A.*, Reliability of fusible tin boiler plugs in service. J 4, 1 (1930) RP129.
- Rosenberg, S. J., French, H. J., Harbaugh, W. Le C., Cross, H. C.*, Wear and mechanical properties of railroad bearing bronzes at different temperatures. J 1, 343 (1928) RP13.
- Rosenberg, S. J., Gagon, D. H.*, Effect of grain size and heat treatment upon impact-toughness at low temperatures of medium forging steel. J 27, 159 (1941) RP1410.
- Rosenberg, S. J., Jordan, L.*, Influence of oxide films on the wear of steels. J 13, 267 (1934) RP708.
- Ross, C. W.*, Thermal expansion of clay building bricks. J 27, 197 (1941) RP1414.
- Ross, D. W.*, Silica refractories — Factors affecting their quality and methods of testing the raw materials and finished ware. T 11, (1918-19) T116.
- Rossini, F. D.*:
Heat capacities in some aqueous solutions. J 4, 313 (1930) RP151.
The heat of formation of water. J 6, 1 (1931) RP259.
The heats of combustion of methane and carbon monoxide. J 6, 37 (1931) RP260.
Heat content values for aqueous solutions of the chlorides, nitrates, and hydroxides of hydrogen, lithium, sodium, and potassium at 18° C. J 6, 791 (1931) RP305.
The heat of ionization of water. J 6, 847 (1931) RP309.
Apparent and partial molar heat capacities in aqueous solutions of 19 univalent electrolytes. J 7, 47 (1931) RP331.
The heat of formation of water and the heats of combustion of methane and carbon monoxide. A correction. J 7, 329 (1931) RP343.
The heats of combustion of methyl and ethyl alcohols. J 8, 119 (1932) RP405.
The heat of formation of hydrogen chloride and some related thermodynamic data. J 9, 679 (1932) RP499.
A simple calorimeter for heats of fusion. Data on the fusion of pseudocumene, mesitylene (alpha and beta), hemimellitene, o- and m-xylene, and on two transitions of hemimellitene. J 11, 553 (1933) RP607.
Calorimetric determination of the heats of combustion of ethane, propane, normal butane, and normal pentane. J 12, 735 (1934) RP686.
Heats of combustion and of formation of the normal paraffin hydrocarbons in the gaseous state, and the energies of their atomic linkages. J 13, 21 (1934) RP692.
Heats of combustion and of formation of the normal aliphatic alcohols in the gaseous and liquid states, and the energies of their atomic linkages. J 13, 189 (1934) RP701.
Heat of combustion of isobutane. J 15, 357 (1935) RP833.
Heat of hydrogenation of ethylene. J 17, 629 (1936) RP935.
Heat and free energy of formation of water and of carbon monoxide. J 22, 407 (1939) RP1192.
- Rossini, F. D., Eckman, J. R.*, The heat of formation of sulphur dioxide. J 3, 597 (1929) RP111.
- Rossini, F. D., Forziati, A. F., Glasgow, Jr., A. R., Willingham, C. B.*, Purification and properties of 29 paraffin, 4 alkylcyclopentane, 10 alkylcyclohexane, and 8 alkylbenzene hydrocarbons. J 36, 129 (1946) RP1695.
- Rossini, F. D., Forziati, A. F., Mair, B. J.*, Assembly and calibration of a density balance for liquid hydrocarbons. J 35, 513 (1945) RP1685.
- Rossini, F. D., Forziati, A. F., Willingham, C. B., Mair, B. J.*, Hydrocarbons in the gasoline fraction of seven representative crudes, including all the distillate to 102° C and the aromatics to 160° C. J 32, 11 (1944) RP1571.

- Rossini, F. D., Frandsen, M., The calorimetric determination of the intrinsic energy of gases as a function of the pressure. Data on oxygen and its mixtures with carbon dioxide to 40 atmospheres, at 28° C. J 9, 733 (1932) RP503.
- Rossini, F. D., Glasgow, Jr., A. R., Reflux regulator and head for laboratory rectifying columns. J 23, 509 (1939) RP1249.
- Rossini, F. D., Glasgow, Jr., A. R., Murphy, E. T., Willingham, C. B., Purification, purity, and freezing points of 31 hydrocarbons of the American Petroleum Institute-National Bureau of Standards series. J 37, 141 (1946) RP1734.
- Rossini, F. D., Glasgow, Jr., A. R., Streiff, A. J., Determination of the purity of hydrocarbons by measurement of freezing points. J 35, 355 (1945) RP1676.
- Rossini, F. D., Glasgow, Jr., A. R., Streiff, A. J., Willingham, C. B., Analyses of alkylates and hydrocodimers. J 38, 537 (1947) RP1795.
- Rossini, F. D., Glasgow, Jr., A. R., Willingham, C. B., Hydrocarbons in the 102° to 108° C fraction of petroleum. J 38, 621 (1947) RP1800.
- Rossini, F. D., Jessup, R. S., Heat and free energy of formation of carbon dioxide, and of the transition between graphite and diamond. J 21, 491 (1938) RP1141.
- Rossini, F. D., Johnson, W. H., Prosen, E. J.: Heats of combustion and isomerization of the eight C₈H₁₈ alkylbenzenes. J 35, 141 (1945) RP1665.
- Heats of combustion of four cyclopentane and five cyclohexane hydrocarbons. J 36, 463 (1946) RP1715.
- Rossini, F. D., Kilpatrick, J. E., Prosen, E. J., Pitzer, K. S., Heats, equilibrium constants, and free energies of formation of the monoolefin hydrocarbons. J 36, 559 (1946) RP1722.
- Rossini, F. D., Knowlton, J. W.: Calorimetric determination of the heats of combustion of ethylene and propylene. J 19, 249 (1937) RP1024.
- Heats of combustion and of formation of the normal olefin (alkene-1) hydrocarbons in the gaseous state. J 19, 339 (1937) RP1028.
- Method and apparatus for the rapid conversion of deuterium oxide into deuterium. J 19, 605 (1937) RP1050.
- Heats of combustion of tetramethylmethane and 2-methylbutane. J 22, 415 (1939) RP1193.
- Rossini, F. D., Knowlton, J. W., Johnston, H. L., Heat and free energy of formation of deuterium oxide. J 24, 369 (1940) RP1287.
- Rossini, F. D., Mair, B. J., Glasgow, Jr., A. R.: Determination of freezing points and amounts of impurity in hydrocarbons from freezing and melting curves. J 26, 591 (1941) RP1397.
- Separation of hydrocarbons by azeotropic distillation. J 27, 39 (1941) RP1402.
- Rossini, F. D., Mair, B. J., Termini, D. J., Willingham, C. B., Purification and sealing "in vacuum" of National Bureau of Standards Standard Samples of hydrocarbons. J 37, 229 (1946) RP1744.
- Rossini, F. D., Pitzer, K. S., Taylor, W. J., Kilpatrick, J. E., Ebert, J. P., Beckett, C. W., Williams, M. G., Werner, H. G., Tables of selected values of hydrocarbons. C461 (1947).
- Rossini, F. D., Prosen, E. J. R.: Heats of isomerization of the five hexanes. J 27, 289 (1941) RP1420.
- Heats of isomerization of the nine heptanes. J 27, 519 (1941) RP1439.
- Heats of combustion of eight normal paraffin hydrocarbons in the liquid state. J 33, 255 (1944) RP1607.
- Some experimental data on the heats of combustion of benzoic acid and carbon (graphite). J 33, 439, (1944) RP1619.
- Heats of formation and combustion of 1,3-butadiene and styrene. J 34, 59 (1945) RP1628.
- Heats of isomerization of the 18 octanes. J 34, 163 (1945) RP1635.
- Heats of combustion and formation of the paraffin hydrocarbons at 25° C. J 34, 263 (1945) RP1642.
- Heats of formation, hydrogenation, and combustion of the monoolefin hydrocarbons through the hexenes, and of the higher 1-alkenes, in the gaseous state at 25° C. J 36, 269 (1946) RP1702.
- Rossini, F. D., Prosen, E. J., Gilmont, R., Heats of combustion of benzene, toluene, ethylbenzene, o-xylene, m-xylene, p-xylene, n-propylbenzene, and styrene. J 34, 65 (1945) RP1629.
- Rossini, F. D., Prosen, E. J., Jessup, R. S., Heat of formation of carbon dioxide and of the transition of graphite into diamond. J 33, 447 (1944) RP1620.
- Rossini, F. D., Prosen, E. J., Johnson, W. H.: Heats of combustion and formation at 25° C of the alkylbenzenes through C₁₀H₈ and of the higher normal monoalkylbenzenes. J 36, 455 (1946) RP1714.
- Heats of formation and combustion of the normal alkylcyclopentanes and cyclohexanes and the increment per CH₂ group for several homologous series of hydrocarbons. J 37, 51 (1946) RP1728.
- Heats of combustion and isomerization of six nonanes. J 38, 419 (1947) RP1783.
- Rossini, F. D., Prosen, E. J. R., Pitzer, K. S.: Free energies and equilibria of isomerization of the butanes, pentanes, hexanes, and heptanes. J 27, 529 (1941) RP1440.
- Free energies and equilibria of isomerization of the 18 octanes. J 34, 255 (1945) RP1641.
- Heats and free energies of formation of the paraffin hydrocarbons, in the gaseous state to 1,500° K. J 34, 403 (1945) RP1650.
- Rossini, F. D., Streiff, A. J., Method for determining individual hydrocarbons in mixtures of hydrocarbons by measurement of freezing points. J 32, 185 (1944) RP1584.
- Rossini, F. D., Streiff, A. J., Murphy, E. T., Cahill, J. C., Flanagan, H. F., Sedlak, V. A., Willingham, C. B., Purification, purity, and freezing points of 8 nonanes, 11 alkylcyclopentanes, 6 alkylcyclohexanes, and 4 butylbenzenes of the American Petroleum Institute-Standard and American Petroleum Institute-National Bureau of Standards series. J 38, 53 (1947) RP1760.
- Rossini, F. D., Streiff, A. J., Murphy, E. T., Sedlak, V. A., Willingham, C. B., Purification, purity, and freezing points of 7 heptanes, 16 octanes, 6 pentenes, cyclopentene, and 7 C₈H₁₆ alkylbenzenes of the American Petroleum Institute-Standard and American Petroleum Institute-National Bureau of Standards series. J 37, 331 (1946) RP1752.
- Rossini, F. D., Taylor, W. J., Theoretical analysis of certain time-temperature freezing and melting curves as applied to hydrocarbons. J 32, 197 (1944) RP1585.
- Rossini, F. D., Taylor, W. J., Pignocco, J. M., Method for calculating the properties of hydrocarbons and its application to the refractive indices, densities and boiling points of the paraffin and monoolefin hydrocarbons. J 34, 413 (1945) RP1651.
- Rossini, F. D., Taylor, W. J., Wagman, D. D., Williams, M. G., Pitzer, K. S., Heats, equilibrium constants, and free energies of formation of the alkylbenzenes. J 37, 95 (1946) RP1732.
- Rossini, F. D., Wagman, D. D., Note on the macro-analysis of carbon and hydrogen by combustion. J 32, 95 (1944) RP1577.
- Rossini, F. D., Wagman, D. D., Kilpatrick, J. E., Pitzer, K. S., Heats, equilibrium constants, and free energies of formation of the acetylene hydrocarbons through the pentyne, to 1,500° K. J 35, 467 (1945) RP1682.
- Rossini, F. D., Wagman, D. D., Kilpatrick, J. E., Taylor, W. J., Pitzer, K. S., Heats, free energies, and equilibrium constants of some reactions involving O₂, H₂, H₂O, C, CO, CO₂, and CH₄. J 34, 143 (1945) RP1634.
- Rossini, F. D., Willingham, C. B.: Improved reflux regulator and head for laboratory distilling columns. J 33, 383 (1944) RP1615.
- Assembly, testing, and operation of laboratory distilling columns of high efficiency. J 37, 15 (1946) RP1724.
- Rossini, F. D., Willingham, C. B., Taylor, W. J., Pignocco, J. M., Vapor pressures and boiling points of some paraffin, alkylcyclopentane, alkylcyclohexane, and alkylbenzene hydrocarbons. J 35, 219 (1945) RP1670.
- Roth, F. L., Driscoll, R. L., Holt, W. L., Frictional properties of rubber. J 28, 439 (1942) RP1463.

Roth, F. L., Holt, W. L.:

Tensile properties of rubber compounds at high rates of stretch. J 23, 603 (1939) RP1256.
Measuring the rate of wear of tire treads. J 32, 61 (1944) RP1574.

Roth, F. L., Wood, L. A., Bekkedahl, N., Measurement of densities of synthetic rubbers. J 29, 391 (1942) RP1507.

Rowen, J. W., Gagliardi, D., Properties of water-repellent fabrics. J 38, 103 (1947) RP1762.

Ruark, A. E., Mohler, F. L., Foote, P. D., Chenault, R. L., Spectra and critical potentials of fifth group elements. S 19, 463 (1923-24) S490.

Rudnick, P., Effect of laundering upon the thermal insulating value of cotton blankets. T 21, 451 (1926-27) T347.

Rudy, R. B., Determination of sulphuric anhydride in portland cement by means of the Wagner turbidimeter. J 16, 555 (1936) RP893.

Russell, H. N., Meggers, W. F.:
An analysis of the arc and spark spectra of scandium (Sc I and Sc II). S 22, 329 (1927-28) S558.

An analysis of the arc and spark spectra of yttrium (Yt I and Yt II). J 2, 733 (1929) RP55.

An analysis of lanthanum spectra (La I, La II, La III). J 9, 625 (1932) RP497.

Term analysis of the first spectrum of vanadium (V I). J 17, 125 (1936) RP906.

Rutherford, H. A., Harris, M.:
Detection of oxidation in wool. J 20, 555 (1938) RP1089.

Reaction of wool with hydrogen peroxide. J 20, 559 (1938) RP1090.

Base-combining capacity of wool. J 22, 535 (1939) RP1203.

Photochemical decomposition of the cystine in wool. J 23, 597 (1939) RP1255.

Concerning the existence of fractions of the sericin in raw silk. J 24, 415 (1940) RP1290.

Photochemical reactions in silk. J 27, 81 (1941) RP1404.

Rutherford, H., Harris, M., Mease, R., Reaction of wool with strong solutions of sulfuric acid. J 18, 343 (1937) RP980.

Rutherford, H. A., Harris, M., Smith, A. L., Estimation of amino nitrogen in insoluble proteins. J 19, 467 (1937) RP1038.

Rutherford, H. A., Minor, F. W., Martin, A. R., Harris, M., Oxidation of cellulose: The reaction of cellulose with periodic acid. J 29, 131 (1942) RP1491.

Rutherford, H. A., Patterson, W. I., Harris, M., Reaction of silk fibroin with diazomethane. J 25, 451 (1940) RP1338.

Rutherford, H. A., Sookne, A. M., Autographic load-elongation apparatus for fibers. J 31, 25 (1943) RP1546.

Rutherford, H. A., Sookne, A. M., Mark, H., Harris, M., Fractionation of cellulose acetate. J 29, 123 (1942) RP1490.

S

Saeger, Jr., C. M., Ash, E. J.:

A method for determining the volume changes occurring in metals during casting. J 8, 37 (1932) RP399.

Volume changes of cast irons during casting. J 8, 601 (1932) RP440.

Properties of gray iron as affected by casting conditions. J 13, 573 (1934) RP726.

Saeger, Jr., C. M., Gardner, H. B., Effects of aluminum and of antimony on certain properties of cast red brass. J 22, 707 (1939) RP1215.

Saeger, Jr., C. M., Gardner, H. B., Krynsky, A. I., Properties of cast red brass as affected by the ambient atmosphere during melting. J 31, 125 (1943) RP1553.

Saeger, Jr., C. M., Jackson, C. E., Use of the pipette method in the fineness test of molding sand. J 14, 59 (1935) RP757.

Saeger, Jr., C. M., Krynsky, A. I.:
Effect of melting conditions on the running quality of aluminum cast in sand molds. J 13, 579 (1934) RP727.

An improved method for preparing cast-iron transverse test bars. J 16, 367 (1936) RP880.

Elastic properties of cast iron. J 22, 191 (1939) RP1176.

Elastic properties of some alloy cast irons. J 28, 73 (1942) RP1447.

Saffioti, W., Bekkedahl, N., Mangabeira latex and rubber. J 38, 427 (1947) RP1785.

Sager, E. E., Keegan, H. J., Acree, S. F., Basic ionization constant of metacresolsulphonphthalein; pH values and salt effects. J 31, 323 (1943) RP1569.

Sager, E. E., Schooley, M. R., Acree, S. F., The assay of potassium *p*-phenolsulfonate, its pH range, and its ultraviolet absorption spectrum. J 31, 197 (1943) RP1558.

Sager, E. E., Schooley, M. R., Carr, A. S., Acree, S. F., Ultraviolet spectra and dissociation constants of *p*-hydroxybenzoic acid, methyl, ethyl, *n*-butyl, and benzyl *p*-hydroxybenzoate, and potassium *p*-phenolsulfonate. J 35, 521 (1945) RP1686.

Sager, T. P.:

Permeability of synthetic film-forming materials to hydrogen. J 13, 879 (1934) RP750.

Permeability of organic polysulphide resins to hydrogen. J 19, 181 (1937) RP1020.

Permeability of elastic polymers to hydrogen. J 25, 309 (1940) RP1327.

Sager, T. P., Sucher, M., Permeability of Neoprene to gases. J 22, 71 (1939) RP1166.

Sale, P. D.:

Specifications for constructing and operating heat-transmission apparatus for testing heat-insulating value of fabrics. T 18, 595 (1924-25) T269.

Compression tests of structural steel at elevated temperatures. J 13, 713 (1934) RP741.

Sale, P. D., Burgess, G. K., A study of the quality of platinum ware. B 12, 289 (1915-16) S254.

Sale, P. D., Hedrick, A. F., Measurement of heat insulation and related properties of blankets. T 18, 529 (1924-25) T266.

Sandholzer, M. W., Flameproofing of textiles. C455 (1946).

Sanford, R. L.:

Temperature coefficient of magnetic permeability within the working range. B 12, 1 (1915-16) S245.

Determination of the degree of uniformity of bars for magnetic standards. B 14, 1 (1918-19) S295.

Notes on the testing of magnetic compasses. S 16, 273 (1920) S382.

Effect of stress on the magnetic properties of steel wire. S 19, 681 (1923-24) S496.

Magnetic reluctivity relationship. S 21, 743 (1926-27) S546.

Some principles governing the choice and utilization of permanent-magnet steels. S 22, 557 (1927-28) S567.

Nondestructive testing of wire hoisting rope by magnetic analysis. T 20, 497 (1925-26) T315.

Apparatus for thermo-magnetic analysis. J 2, 659 (1929) RP50.

Standards for testing magnetic permeameters. J 4, 177 (1930) RP140.

Performance of the Fahy simplex permeameter. J 4, 703 (1930) RP174.

A method for the standardization of permeameters at high magnetizing forces. J 6, 355 (1931) RP279.

A magnetic balance for the inspection of austenitic steel. J 10, 321 (1933) RP532.

Drift of magnetic permeability at low inductions after demagnetization. J 13, 371 (1934) RP714.

An alternating-current magnetic comparator, and the testing of tool-resisting prison bars. J 16, 563 (1936) RP894.

Magnetic testing. C415 (1937).

Permanent magnets. C448 (1944).

Magnetic testing. C456 (1946).

Sanford, R. L., Barry, J. M., Determination of the magnetic induction in sheet steel. S 21, 727 (1926-27) S545.

Sanford, R. L., Bennett, E. G.:

An apparatus for magnetic testing at high magnetizing forces. J 10, 567 (1933) RP548.

Determination of magnetic hysteresis with the Fahy Simplex permeameter. J 15, 517 (1935) RP845.

An apparatus for magnetic testing at magnetizing forces up to 5,000 oersteds. J 23, 415 (1939) RP1242.

- A determination of the magnetic saturation induction of iron at room temperature. *J* 26, 1 (1941) RP1354.
- Sanford, R. L., Burrows, C. W.*, An experimental study of the Fahy permeameter. *B* 14, 267 (1918-19) S306.
- Sanford, R. L., Cheney, W. L.*, Variation of residual induction and coercive force with magnetizing force. *S* 16, 291 (1920) S384.
- Sanford, R. L., Cheney, W. L., Barry, J. M.*, Effect of wear on the magnetic properties and tensile strength of steel wire. *S* 20, 339 (1924-26) S510.
- Sanford, R. L., Ellinger, G. A.*, Prolonged tempering at 100° C and aging at room temperature of 0.8 percent carbon steel. *J* 13, 259 (1934) RP707.
- Sanford, R. L., Kouwenhoven, W. B.*, Location of flaws in rifle-barrel steel by magnetic analysis. *S* 15, 219 (1919-20) S343.
- Sanford, R. L., Marshall, L. H.*, The magnetic susceptibility and iron content of cast red brass. *T* 17, 1 (1922-24) T221.
- Saunders, J. B.*:
Improved interferometric procedure with application to expansion measurements. *J* 23, 179 (1939) RP1227.
Expansivity of a Vycor brand glass. *J* 28, 51 (1942) RP1445.
Interferometer measurements on the expansion of iron. *J* 33, 75 (1944) RP1597.
An apparatus for photographing interference phenomena. *J* 35, 157 (1945) RP1668.
- Saunders, J. B., Tool, A. Q.*:
Effect of heat treatment on the expansivity of a pyrex glass. *J* 11, 799 (1933) RP626.
Expansion effects on the inversion of silica crystals in certain devitrified glasses. *J* 21, 773 (1938) RP1153.
- Saunders, J. B., Tool, A. Q., Tilton, L. W.*, Changes caused in the refractivity and density of glass by annealing. *J* 38, 519 (1947) RP1793.
- Saylor, C. P.*:
A thin cell for use in determining the refractive indices of crystal grains. *J* 15, 97 (1935) RP814.
Accuracy of microscopical methods for determining refractive index by immersion. *J* 15, 277 (1935) RP829.
- Saylor, C. P., Ashton, F. W., Houston, D. F.*, The optical properties, densities, and solubilities of the normal formates of some metals of group II of the periodic system. *J* 11, 233 (1933) RP587.
- Saylor, C. P., Smith, W. H.*:
Ether-insoluble or gel rubber hydrocarbon, its solution, crystallization, and properties. *J* 13, 453 (1934) RP719.
Optical and dimensional changes which accompany the freezing and melting of Hevea rubber. *J* 21, 257 (1938) RP1129.
- Saylor, C. P., Smith, W. H., Wing, H. J.*, The preparation and crystallization of pure ether-soluble rubber hydrocarbon: Composition, melting point, and optical properties. *J* 10, 479 (1933) RP544.
- Schad, L. W., Hidnert, P.*, Preliminary determination of the thermal expansion of molybdenum. *S* 15, 31 (1919-20) S332.
- Schad, L. W., Merica, P. D.*, Thermal expansion of alpha and of beta brass between 0° and 600° C, in relation to the mechanical properties of heterogeneous brasses of the Muntz Metal type. *B* 14, 571 (1918-19) S321.
- Schenke, E. M., Schoffstall, C. W.*:
Standardization of hosiery box dimensions. *T* 18, 157 (1924-25) T253.
Standard hosiery lengths. *T* 20, 667 (1925-26) T324.
- Schenke, E. M., Shearer, H. E.*:
Strength and elongation of silk yarns as affected by humidity. *J* 25, 783 (1940) RP1353.
Methods of testing hosiery. C422 (1938).
- Scherrer, J. A.*:
Determination of tin in irons and steels. *J* 8, 309 (1932) RP415.
Determination of gallium in aluminum. *J* 15, 585 (1935) RP853.
Distillation and separation of arsenic, antimony, and tin. *J* 16, 253 (1936) RP871.
Determination of arsenic, antimony, and tin in lead-, ten-, and copper-base alloys. *J* 21, 95 (1938) RP1116.
- Scherrer, J. A., Bell, R. K., Mogerman, W. D.*, Electroanalytical determination of copper and lead in nitric acid solution containing small amounts of hydrochloric acid. *J* 22, 697 (1939) RP1213.
- Scherrer, J. A., Freeman, Jr., J. R., Rosenberg, S. J.*, Reliability of fusible tin boiler plugs in service. *J* 4, 1 (1930) RP129.
- Scherrer, J. A., Lundell, G. E. F.*, The importance of particle size in samples of certain metallurgical materials. *J* 5, 891 (1930) RP237.
- Scherrer, J. A., Mogerman, W. D.*, Improved method for determination of aluminum in certain non-ferrous materials by use of ammonium aurintricarboxylate. *J* 21, 105 (1938) RP1117.
- Scherrer, J. A., Smith, W. H.*, Preparation of ammonium aurintricarboxylate. *J* 21, 113 (1938) RP1118.
- Schickltanz, S. T.*:
Note on an improved chain-packed distilling column. *J* 11, 89 (1933) RP579.
A fractionating column with fritted glass plates. *J* 12, 259 (1934) RP651.
An apparatus for measuring the boiling points of lubricating oils and other compounds of high molecular weight at reduced pressures. *J* 14, 685 (1935) RP796.
Separation of constant-boiling mixtures of naphthalene and paraffin hydrocarbons by distillation with acetic acid. *J* 18, 129 (1937) RP967.
A laboratory extraction apparatus and its use in separating a lubricating-oil fraction with acetic acid. *J* 20, 83 (1938) RP1067.
- Schickltanz, S. T., Bruun, J. H.*, Laboratory rectifying stills of glass. *J* 7, 851 (1931) RP379.
- Schickltanz, S. T., Bruun, J. H., Leslie, R. T.*, Determination of the toluene content of a mid-continent petroleum. *J* 6, 363 (1931) RP280.
- Schickltanz, S. T., Glasgow, Jr., A. R.*, Study of ball packings for laboratory rectifying columns. *J* 19, 593 (1937) RP1049.
- Schickltanz, S. T., Leslie, R. T.*, Separation of normal octane from petroleum by distillation and crystallization. *J* 6, 377 (1931) RP282.
- Schickltanz, S. T., Mair, B. J.*:
The isolation of mesitylene, pseudocumene, and hemimellitene from an Oklahoma petroleum. *J* 11, 665 (1933) RP614.
Extraction, with acetone, of substantially constant-boiling fractions of a "water-white" lubricating oil. *J* 17, 909 (1936) RP953.
- Schickltanz, S. T., Mair, B. J., Rose, Jr., F. W.*, Apparatus and methods for investigating the chemical constitution of lubricating oil, and preliminary fractionation of the lubricating oil fraction of a mid-continent petroleum. *J* 15, 557 (1935) RP849.
- Schiefer, H. F.*:
The flexometer, an instrument for evaluating the flexural properties of cloth and similar materials. *J* 10, 647 (1933) RP555.
The compressometer, an instrument for evaluating the thickness, compressibility, and compressional resilience of textiles and similar materials. *J* 10, 705 (1933) RP561.
Evaluation of crush-resistant finishing treatments for fabrics. *J* 19, 571 (1937) RP1047.
Evaluation of crease-resistant finishes for fabrics. *J* 20, 241 (1938) RP1077.
Wear testing of carpets. *J* 29, 333 (1942) RP1505.
Advantages of a blanket-and-sheet combination for outdoor use. *J* 30, 209 (1943) RP1529.
Machines and methods for testing cordage fibers. *J* 33, 315 (1944) RP1611.
- Schiefer, H. F., Appel, W. D.*, Hosiery testing machine. *J* 12, 543 (1934) RP679.
- Schiefer, H. F., Best, A. S.*:
A portable instrument for measuring air permeability of fabrics. *J* 6, 51 (1931) RP261.
Carpet wear testing machine. *J* 6, 927 (1931) RP315.
- Schiefer, H. F., Boyland, P. M.*:
Improved instrument for measuring the air permeability of fabrics. *J* 28, 637 (1942) RP1471.
Note on flexural fatigue of textiles. *J* 29, 69 (1942) RP1485.
- Schiefer, H. F., Cleveland, R. S.*:
Wear of carpets. *J* 12, 155 (1934) RP640.
Factors affecting the performance of hosiery on the hosiery testing machine. *J* 14, 1 (1935) RP753.

- A critical study of some factors affecting the breaking strength and elongation of cotton yarns. J 27, 325 (1941) RP1422.
- A basis for a performance specification for women's full-fashioned silk hosiery. M149 (1935).
- Schiefer, H. F., Cleveland, R. S., Porter, J. W., Miller, J., Effect of weave on the properties of cloth. J 11, 441 (1933) RP600.
- Schiefer, H. F., Mizell, L. R., Mosedale, F. T., Part-work blankets for use in barracks. J 30, 203 (1943) RP1528.
- Schiefer, H. F., Stevens, H. T., Mack, P. B., Boyland, P. M., A study of the properties of household blankets. J 32, 261 (1944) RP1589.
- Schiefer, H. F., Taft, D. H.: Mechanical properties of cotton yarns. J 15, 237 (1935) RP826.
- Effect of yarn twist on the properties of cloth. J 16, 131 (1936) RP861.
- Schiefer, H. F., Taft, D. H., Porter, J. W., Effect of number of warp and filling yarns per inch and some other elements of construction on the properties of cloth. J 16, 139 (1936) RP862.
- Schlecht, W. G., Wichers, E., Gordon, C. L.: Attack of refractory platiniferous materials by acid mixtures at elevated temperatures. J 33, 363 (1944) RP1614.
- Preparing refractory oxides, silicates, and ceramic materials for analysis by heating with acids in sealed tubes at elevated temperatures. J 33, 451 (1944) RP1621.
- Use of sealed tubes for the preparation of acid solutions of samples for analysis, or for small scale refining: Pressures of acids heated above 100° C. J 33, 457 (1944) RP1622.
- Schlink, F. J.: Variance of measuring instruments and its relation to accuracy and sensitivity. B 14, 741 (1918-19) S328.
- Liquid-measuring pumps. T 8, (1916-17) T81.
- Stabilized-platform weighing scale of novel design. T 10, (1917-18) T106.
- Area measurement of leather. T 13, (1919-20) T153.
- Liquid-measuring pumps. Appendix 2 of M14 (1917).
- Schmid, B. C., Finn, A. N., Young, J. C., Thermal expansions of some soda-lime-silica glasses as functions of the composition. J 12, 421 (1934) RP667.
- Schoffstall, C. W., Boyden, R. C., Development of a standard bending test for rope yarns. T 19, 723 (1924-25) T300.
- Schoffstall, C. W., Coblenz, W. W., Stair, R., Some measurements of the transmission of ultra-violet radiation through various kinds of fabrics. J 1, 105 (1928) RP6.
- Schoffstall, C. W., Fisher, R. T., Development of the standard numbered cotton duck specification: Study of methods of tests and tolerances. T 18, 443 (1924-25) T264.
- Schoffstall, C. W., Goldman, M. H., Hubbard, C. C., Effect of dry cleaning on silks. A comparison of the effect of dry cleaning and some service conditions on the strength of silk. T 20, 605 (1925-26) T322.
- Schoffstall, C. W., Hamm, H. A., A multiple-strand test for yarns. J 2, 871 (1929) RP61.
- Schoffstall, C. W., McGowan, F. R., Tentative standard test methods and percentages of oil and moisture in hair press cloths. T 17, 257 (1922-24) T231.
- Schoffstall, C. W., McGowan, F. R., Mercier, A. A.: A study of silk waste used for cartridge-bag cloth, with an appendix on the general classification of waste silk. T 18, 567 (1924-25) T268.
- Comparative wearing qualities of pima and ordinary cotton used in mail bags. T 19, 73 (1924-25) T277.
- Effect of twist on the physical properties of a number 7s yarn. T 19, 85 (1924-25) T278.
- Schoffstall, C. W., McGowan, F. R., Smither, F. W., Performance tests of a liquid laundry soap used with textile materials. T 19, 1 (1924-25) T273.
- Schoffstall, C. W., Mercier, A. A., Effect of twist on cotton yarns. J 1, 733 (1928) RP27.
- Schoffstall, C. W., Schenke, E. M.: Standardization of hosiery box dimensions. T 18, 157 (1924-25) T253.
- Standard hosiery lengths. T 20, 667 (1925-26) T324.
- Schofield, F. H., Roesser, W. F., Moser, H. A., An international comparison of temperature scales between 660° and 1,063° C. J 11, 1 (1933) RP573.
- Schooley, M. R., Sager, E. E., Acree, S. F., The assay of potassium *p*-phenolsulfonate, its pH range, and its ultraviolet absorption spectrum. J 31, 197 (1943) RP1558.
- Schooley, M. R., Sager, E. E., Carr, A. S., Acree, S. F., Ultraviolet spectra and dissociation constants of *p*-hydroxybenzoic acid, methyl, ethyl, *n*-butyl, and benzyl *p*-hydroxybenzoate, and potassium *p*-phenolsulfonate. J 35, 521 (1945) RP1686.
- Schoonover, I. C., A colorimetric method for the quantitative determination of small amounts of silver by use of *p*-dimethylaminobenzalrhodanine. J 15, 377 (1935) RP836.
- Schoonover, I. C., Caul, H. J., Analysis of dental amalgams containing mercury, silver, gold, tin, copper, and zinc. J 26, 481 (1941) RP1391.
- Schoonover, I. C., Rogers, B. A., Jordan, L., Silver: Its properties and industrial uses. C412 (1936).
- Schoonover, I. C., Souder, W., Abrasion and solution of teeth. J 31, 247 (1943) RP1563.
- Schramm, E., Cain, J. R., Cleaves, H. E., Preparation of pure iron and iron-carbon alloys. B 13, 1 (1916-17) S266.
- Schreiber, W. T., Geib, M. N. V., Moore, O. C.: Consistency of potato-starch size. J 11, 765 (1933) RP623.
- Effect of sizing, weaving, and abrasion on the physical properties of cotton yarn. J 18, 559 (1937) RP993.
- Schrodt, J. P., Holler, H. D., Theory and performance of rectifiers. T 18, 465 (1924-25) T265.
- Schubauer, G. B., Effect of humidity in hot-wire anemometry. J 15, 575 (1935) RP850.
- Schubauer, G. B., Mason, M. A., Performance characteristics of a water current meter in water and in air. J 18, 351 (1937) RP981.
- Schubauer, G. B., Skramstad, H. K., Laminar boundary-layer oscillations and transition on a flat plate. J 38, 251 (1947) RP1772.
- Schuhmann, S., Branham, J. R., Shepherd, M., Critical study of the determination of carbon monoxide by combustion over platinum in the presence of excess oxygen. J 26, 571 (1941) RP1396.
- Schuhmann, S., Shepherd, M., Flinn, R. H., Hough, J. W., Neal, P. A., Hazard of mercury vapor in scientific laboratories. J 26, 357 (1941) RP1383.
- Schuhmann, S., Teele, R. P., A potentiometer for measuring voltages of 10 microvolts to an accuracy of 0.01 microvolt. J 22, 431 (1939) RP1195.
- Schuman, L., Ten-year tests of high-early-strength cement concretes. J 29, 397 (1942) RP1508.
- Schuman, L., Pisapia, E. A., Behavior of high-early-strength cement concretes and mortars under various temperature and humidity conditions. J 14, 723 (1935) RP799.
- Schuman, L., Tucker, Jr., J.: A portable apparatus for determining the relative wear resistance of concrete floors. J 23, 549 (1939) RP1252.
- Tensile and other properties of concretes made with various types of cements. J 31, 107 (1943) RP1552.
- Schurech, H. G., Bleininger, A. V., Properties of some European plastic fire clays. T 3, (1916-17) T79.
- Schurech, H. G., Pole, G. R.: Effect of water on expansions of ceramic bodies of different composition. J 3, 331 (1929) RP98.
- Method of measuring strains between glazes and ceramic bodies. J 5, 97 (1930) RP189.
- Moisture expansion of glazes and other ceramic finishes. J 6, 457 (1931) RP288.
- Schwab, F. W., Wichers, E.: Preparation of benzoic acid of high purity. J 25, 747 (1940) RP1351.
- Purification of substances by slow fractional freezing. J 32, 253 (1944) RP1588.
- A physical method for determining residual water and other volatile materials in pure substances. J 33, 121 (1944) RP1600.

- Freezing temperature of benzoic acid as a fixed point in thermometry. *J* 34, 333 (1945) RP1647.
- Scotfield, G. G., Slater, W. A., Richard, F. E., Tests of bond resistance between concrete and steel. *T* 14, (1920-21) T173.
- Scotnik, R., George, W. D., Selby, M. C., Electrical characteristics of quartz-crystal units and their measurement. *J* 38, 309 (1947) RP1774.
- Scott, A. H.: Specific volume, compressibility, and volume thermal expansivity of rubber-sulphur compounds. *J* 14, 99 (1935) RP760.
- Effect of pressure on the dielectric constant, power factor, and conductivity of rubber-sulphur compounds. *J* 15, 13 (1935) RP806.
- Dielectric constant, power factor, and resistivity of marble. *J* 24, 235 (1940) RP1281.
- Scott, A. H., Curtis, H. L.: Change of electrical properties of rubber and gutta-percha during storage under water. *J* 5, 539 (1930) RP213.
- Edge correction in the determination of dielectric constant. *J* 22, 747 (1939) RP1217.
- Scott, A. H., Curtis, H. L., McPherson, A. T., Density and electrical properties of the system rubber-sulphur. Part II. Electrical properties of rubber-sulphur compounds. *S* 22, 383 (1927-28) S560.
- Scott, A. H., McPherson, A. T., Dielectric constant, power factor, and conductivity of the system rubber-calcium carbonate. *J* 28, 279 (1942) RP1457.
- Scott, A. H., McPherson, A. T., Curtis, H. L., Effect of temperature and frequency on the dielectric constant, power factor, and conductivity of compounds of purified rubber and sulphur. *J* 11, 173 (1933) RP585.
- Scott, A. H., Selker, A. H., McPherson, A. T., Electrical and mechanical properties of the system Buna-S-gilsonite. *J* 31, 141 (1943) RP1554.
- Scott, H.: The effect of rate of temperature change on the transformations in an alloy steel. *S* 15, 91 (1919-20) S335.
- Critical ranges of some commercial nickel steels. *S* 16, 195 (1920) S376.
- Relation of the high-temperature treatment of high-speed steel to secondary hardening and red hardness. *S* 16, 521 (1920) S395.
- Origin of quenching cracks. *S* 20, 399 (1924-26) S513.
- Scott, H., Burgess, G. K., Thermoelectric measurement of critical ranges of pure iron. *B* 14, 15 (1918-19) S296.
- Scott, H., Freeman, J. R., Use of a modified Rosenhain furnace for thermal analysis. *S* 15, 317 (1919-20) S348.
- Scott, H., Merica, P. D., Wallenberg, R. G., The heat treatment of duralumin. *S* 15, 271 (1919-20) S347.
- Scott, H., Movius, H. G., Thermal and physical changes accompanying the heating of hardened carbon steels. *S* 16, 537 (1920) S396.
- Scott, H., Nusbaum, C., Cheney, W. L., The magnetic reluctivity relationship as related to certain structures of a eutectoid-carbon steel. *S* 16, 739 (1920) S404.
- Scott, H., Rawdon, H. S., Notes on the microstructure of iron and mild steel at high temperatures. *S* 15, 519 (1919-20) S356.
- Scott, R. B., Calibration of thermocouples at low temperatures. *J* 25, 459 (1940) RP1339.
- Scott, R. B., Bekkedahl, N., Specific heat of the synthetic rubber Hycar O. R. from 15° to 340° K. *J* 29, 87 (1942) RP1487.
- Scott, R. B., Brickwedde, F. G.: A precision cryostat with automatic temperature regulation. *J* 6, 401 (1931) RP284.
- Molecular volumes and expansivities of liquid normal hydrogen and parahydrogen. *J* 19, 237 (1937) RP1023.
- Thermodynamic properties of solid and liquid ethylbenzene from 0° to 300° K. *J* 35, 501 (1945) RP1684.
- Scott, R. B., Brickwedde, F. G., Taylor, H. S., The difference in vapor pressures of ortho- and para-deuterium. *J* 15, 463 (1935) RP841.
- Scott, R. B., Cook, J. W., Brickwedde, F. G., Silvering and evacuating pyrex Dewar flasks. *J* 7, 935 (1931) RP385.
- Scott, R. B., Ferguson, W. J., Brickwedde, F. G., Thermodynamic properties of *cis*-2-butene from 15° to 1,500° K. *J* 33, 1 (1944) RP1592.
- Scott, R. B., Mellors, J. W., Specific heats of gaseous 1,3-butadiene, isobutene, styrene, and ethylbenzene. *J* 34, 243 (1945) RP1640.
- Scott, R. B., Meyers, C. H., Rands, Jr., R. D., Brickwedde, F. G., Bekkedahl, N., Thermodynamic properties of 1,3-butadiene in the solid, liquid, and vapor states. *J* 35, 39 (1945) RP1661.
- Scott, R. B., Silsbee, F. B., Brickwedde, F. G.: A new phenomenon in the superconducting transition of tantalum and of tin. *J* 18, 295 (1937) RP977.
- Some experiments at radio frequencies on superconductors. *J* 20, 109 (1938) RP1070.
- Scott, R. B., Wacker, P. F., Cheney, R. K., Heat capacities of gaseous oxygen, isobutane, and 1-butene from -80° to +90° C. *J* 38, 651 (1947) RP1804.
- Scribner, B. F.: Analytical methods employed in the analysis of high-purity iron. Spectrochemical analysis. Appendix to *J* 23, 174 (1939) RP1226.
- Spark spectrographic analysis of commercial tin. *J* 28, 165 (1942) RP1451.
- Scribner, B. W., Carson, F. T., Weber, C. G., Development of standards for flexible caselining materials. M182 (1946).
- Scribner, B. F., Corliss, C. H.: An improved electrode holder for spectrographic analysis. *J* 30, 41 (1943) RP1515.
- Spectrographic determination of boron in steel. *J* 26, 351 (1946) RP1705.
- Scribner, B. F., Helz, A. W., Spectrographic determination of minor elements in portland cement. *J* 38, 439 (1947) RP1786.
- Scribner, B. F., Hoffman, J. I., Purification of gallium by fractional crystallization of the metal. *J* 15, 205 (1935) RP823.
- Scribner, B. F., Meggers, W. F.: Regularities in the arc spectrum of hafnium (HfI). *J* 14, 169 (1930) RP139.
- Regularities in the spectra of lutecium. *J* 5, 73 (1930) RP187.
- Second spectrum of hafnium (Hf II). *J* 13, 625 (1934) RP732.
- Multiplets and terms in the first two spectra of columbium. *J* 14, 629 (1935) RP793.
- Arc and spark spectra of lutecium. *J* 19, 31 (1937) RP1008.
- Arc and spark spectra of ytterbium. *J* 19, 651 (1937) RP1053.
- Scribner, B. F., Mullin, H. R., Carrier-distillation method for spectrographic analysis and its application to the analyses of uranium-base materials. *J* 37, 379 (1946) RP1753.
- Scribner, B. W.: Comparison of accelerated aging of record papers with normal aging for 8 years. *J* 23, 405 (1939) RP1241.
- Standards for paper towels. C294 (1925).
- Preservation of newspaper records. M145 (1934).
- Summary report of research at the National Bureau of Standards on the stability and preservation of records on photographic film. M162 (1939).
- Protection of documents with cellulose acetate sheeting. M168 (1940).
- Scribner, B. W., Brode, W. R., A modified method for determination of the copper number of paper. *T* 22, 9 (1927-28) T354.
- Scribner, B. W., Carr, R. W., Standards for paper towels. C407 (1935).
- Scribner, B. W., Carson, F. T., A study of caselining papers for the purpose of developing standards and specifications. *T* 20, 355 (1925-26) T312.
- Scribner, B. W., Kimberly, A. E.: Summary report of Bureau of Standards research on preservation of records. M144 (1934).
- Summary report of National Bureau of Standards research on preservation of records. M154 (1937).
- Scribner, B. W., Rasch, R. H., Comparison of natural aging of paper with accelerated aging by heating. *J* 11, 727 (1933) RP620.
- Scribner, B. W., Wilson, W. K., Methods for the evaluation of analytical filter papers. *J* 34, 453 (1945) RP1653.

- Sequist, E. O., Whittemore, H. L., Adelson, J. S., Physical properties of electrically welded steel tubing. J 4, 475 (1930) RP161.
- Sequist, E. O., Whittemore, H. L., Nusbaum, G. W.: The relation of torque to tension for threading devices. J 7, 945 (1931) RP386.
- Impact and static tensile properties of bolts. J 14, 139 (1935) RP763.
- Sectional Committee on Building Code Requirements and Good Practice Recommendations for Masonry A11, American Standard Building code requirements for masonry. M174 (1944).
- Sedlak, V. A., Streiff, A. J., Murphy, E. T., Willingham, C. B., Rossini, F. D., Purification, purity, and freezing points of 7 heptanes, 16 octanes, 6 pentenes, cyclopentene, and 7 C₉H₁₂ alkylbenzenes of the American Petroleum Institute-Standard and American Petroleum Institute-National Bureau of Standards series. J 37, 331 (1946) RP1752.
- Sedlak, V. A., Willingham, C. B., Rossini, F. D., Streiff, A. J., Murphy, E. T., Cahill, J. C., Flanagan, H. F., Purification, purity, and freezing points of 8 nonanes, 11 alkylcyclopentanes, 6 alkylcyclohexanes, and 4 butylbenzenes of the American Petroleum Institute-Standard and American Petroleum Institute-National Bureau of Standards series. J 38, 53 (1947) RP1760.
- Seely, F. B., Slater, W. A., Tests of heavily reinforced concrete slab beams: Effect of direction of reinforcement on strength and deformation. T 17, 297 (1922-24) T233.
- Sefton, L. B., Estimation of nitrates and nitrites in battery acid. T 13, (1919-20) T149.
- Selby, M. C., Scolnik, R., George, W. D., Electrical characteristics of quartz-crystal units and their measurements. J 33, 309 (1947) RP1774.
- Selker, A. H., Scott, A. H., McPherson, A. T., Electrical and mechanical properties of the system Buna S-gilsonite. J 31, 141 (1943) RP1554.
- Sellman, A. H., Curtis, H. L., Wadleigh, W. H., A camera for studying projectiles in flight. T 18, 189 (1924-25) T255.
- Selvig, W. A., McBride, R. S., Coking of Illinois coal in Koppers type oven. T 12, (1919) T137.
- Sentel, C., Paints for exterior masonry walls. BMS110 (1947).
- Shartsis, L., Flint, E. P., Clarke, W. F., Newman, E. S., Bishop, D. L., Wells, L. S., Extraction of alumina from clays and high-silica bauxites. J 36, 63 (1946) RP1691.
- Shartsis, L., Harrison, W. N., Determination of thickness of acid-resistant portion of vitreous enamel coatings. J 25, 71 (1940) RP1315.
- Shartsis, L., Smock, A. W., Surface tensions of some optical glasses. J 38, 241 (1947) RP1771.
- Shaw, J. B., Enamels for sheet iron and steel. T 13, (1919-20) T165.
- Shaw, M. B., Bicking, G. W.: Comparison of American and foreign clays as paper fillers. T 18, 337 (1924-25) T262.
- A comparative study of paper fillers. T 19, 733 (1924-25) T301.
- Research on the production of currency paper in the Bureau of Standards experimental paper mill. T 21, 89 (1926-27) T329.
- Caroá fiber as a paper-making material. T 21, 323 (1926-27) T340.
- Further experimental production of currency paper in the Bureau of Standards paper mill. J 3, 899 (1929) RP121.
- Rayon as a paper-making material. J 4, 203 (1930) RP143.
- Shaw, M. B., Bicking, G. W., O'Leary, M. J.: Further study of paper-coating minerals and adhesives. J 5, 1189 (1930) RP254.
- The paper-making properties of phormium tenax (New Zealand flax). J 6, 411 (1931) RP285.
- A study of the relation of some properties of cotton rags to the strength and stability of experimental papers made from them. J 14, 649 (1935) RP794.
- Shaw, M. B., Bicking, G. W., Snyder, L. W., The preparation of fiber test sheets. J 5, 105 (1930) RP190.
- Shaw, M. B., Bicking, G. W., Strieler, O. G., Experimental production of roofing felts. J 2, 1001 (1929) RP67.
- Shaw, M. B., Carson, F. T., Wearing quality of experimental currency-type paper. J 36, 249 (1946) RP1701.
- Shaw, M. B., Judd, D. B., Harrison, W. N., Sweo, B. J., Hickson, E. F., Eickhoff, A. J., Paffenbarger, G. C., Optical specification of light-scattering materials. J 19, 287 (1937) RP1026.
- Shaw, M. B., O'Leary, M. J.: Study of the effect of fiber components on the stability of book papers. J 17, 859 (1936) RP949.
- Effect of filling and sizing materials on stability of book papers. J 21, 671 (1938) RP1149.
- Shaw, M. B., Rasch, R. H., Bicking, G. W.: Highly purified wood fibers as paper-making material. J 7, 765 (1931) RP372.
- A study of some factors influencing the strength and stability of experimental papers made from two different sulphite pulps. J 11, 7 (1933) RP574.
- Shaw, M. B., Simmons, R. H., Printing tests of experimental book papers. J 22, 285 (1939) RP1180.
- Shaw, M. B., Weber, C. G., Experimental manufacture of paper for war maps. J 37, 325 (1946) RP1751.
- Shaw, M. B., Weber, C. G., Back, E. A., Effects of fumigants on paper. J 15, 271 (1935) RP828.
- Shaw, M. B., Weber, C. G., Geib, M. N., O'Leary, M. J., An experimental study of beater practice in the manufacture of offset papers. J 28, 241 (1942) RP1455.
- Shaw, M. B., Weber, C. G., O'Leary, M. J.: Further experimental study of beater practice in the manufacture of offset papers. J 30, 267 (1943) RP1532.
- Papermaking quality of cornstalks. M147 (1935).
- Suitability of sweetpotato starch for the beater sizing of paper. M150 (1935).
- Shawn, G. B., Berry, W. M., Brumbaugh, I. V., Eiseman, J. H., Moulton, G. F., Relative usefulness of gases of different heating value and adjustments of burners for changes in heating value and specific gravity. T 17, 15 (1922-24) T222.
- Shawn, G. B., Berry, W. M., Brumbaugh, I. V., Moulton, G. F., Design of atmospheric gas burners. T 15, (1921) T193.
- Shawn, G. B., Weaver, E. R., Eiseman, J. H., A method for testing gas appliances to determine their safety from producing carbon monoxide. T 20, 125 (1925-26) T304.
- Shearer, H. E., Schenke, E. M.: Strength and elongation of silk yarns as affected by humidity. J 25, 783 (1940) RP1353.
- Methods of testing hosiery. C422 (1938).
- Shearer, W. L., Pressler, E. E., Properties of potters' flints and their effects in white-ware bodies. T 20, 289 (1925-26) T310.
- Shelton, G. R., Bunting, E. N., Creamer, A. S., Properties of barium-strontium titanate dielectrics. J 33, 337 (1947) RP1776.
- Shelton, G. R., Holscher, H. H., Gases obtained from commercial feldspars heated in vacuo. J 8, 347 (1932) RP420.
- Shelton, S. M., Thermal conductivity of some irons and steels over the temperature range 100° to 500° C. J 12, 441 (1934) RP669.
- Shelton, S. M., Harrison, W. N., Stephens, R. E., Consistency of eight types of vitreous enamel frits at and near firing temperatures. J 20, 39 (1938) RP1063.
- Shelton, S. M., Harrison, W. N., Sweo, B. J., Thermal-expansion characteristics of some ground-coat enamel frits. J 22, 127 (1939) RP1172.
- Shelton, S. M., Swanger, W. H., Fatigue properties of steel wire. J 14, 17 (1935) RP754.
- Shelton, S. M., Van Dusen, M. S., Apparatus for measuring thermal conductivity of metals up to 600° C. J 12, 429 (1934) RP668.
- Shepard, E. R.: Modern practice in the construction and maintenance of rail joints and bonds in electric railways. T 7, (1916-17) T62.
- Leakage resistance of street-railway roadbeds and its relation to electrolysis of underground structures. T 12, (1919) T127.
- Pipe-line currents and soil resistivity as indicators of local corrosive soil areas. J 6, 683 (1931) RP298.

- Abstracts and summaries of the Bureau of Standards publications on stray-current electrolysis. C401 (1933).
- Shepherd, M.:*
A weight burette for the micromasurement of liquid volumes. S 22, 287 (1927-28) S555.
The accurate determination of the gasoline content of natural gas and the analytical separation of natural gases by fractional isothermal distillation. J 2, 1145 (1929) RP75.
A simple control stopcock for gas analysis apparatus. J 4, 23 (1930) RP130.
A gas analysis pipette for difficult absorptions. J 4, 747 (1930) RP177.
An improved apparatus and method for the analysis of gas mixtures by combustion and absorption. J 6, 121 (1931) RP266.
A critical test for the purity of gases. J 12, 185 (1934) RP643.
Significant vapor pressure considerations of the Van Slyke manometric method of gas analysis. J 12, 551 (1934) RP680.
Method for determining uniformity of temperature in cryostats. J 21, 831 (1938) RP1158.
Analytical separation and purification of gases by fractional distillation and rectification at low temperatures. J 26, 227 (1941) RP1372.
Modifications of apparatus for volumetric gas analysis. J 26, 351 (1941) RP1382.
Analysis of a standard sample of the carburetted water-gas type by laboratories cooperating with the American Society for Testing Materials. J 36, 313 (1946) RP1704.
Analysis of a standard sample of natural gas by laboratories cooperating with the American Society for Testing Materials. J 38, 19 (1947) RP1759.
Determination of small amounts of carbon monoxide in air by various reference methods. J 38, 351 (1947) RP1777.
Cooperative analysis of a standard sample of natural gas with the mass spectrometer. J 38, 491 (1947) RP1789.
Glass stopcocks. C430 (1941).
- Shepherd, M., Bailey, H. W.,* An apparatus for the absorption or gravimetric determination of constituents of a gas mixture. J 26, 347 (1941) RP1381.
- Shepherd, M., Branham, J. R.:*
Critical study of the determination of ethane by combustion over platinum in the presence of excess oxygen. J 11, 783 (1933) RP625.
Critical study of the determination of ethane by explosion with oxygen or air. J 13, 377 (1934) RP715.
Gasometric method and apparatus for the analysis of mixtures of ethylene oxide and carbon dioxide. J 22, 171 (1939) RP1175.
- Shepherd, M., Branham, J. R., Schuhmann, S.*
Critical study of the determination of carbon monoxide by combustion over platinum in the presence of excess oxygen. J 26, 571 (1941) RP1396.
- Shepherd, M., Schuhmann, S., Flinn, R. H., Hough, J. W., Neal, P. A.,* Hazard of mercury vapor in scientific laboratories. J 26, 357 (1941) RP1383.
- Shepherd, M., Sperling, E. O.,* A manometric gas analysis apparatus. J 26, 341 (1941) RP1380.
- Shepherd, M., Weaver, E. R.,* A burette for the accurate measurement of gas volumes without gas connection to a compensator. S 22, 375 (1927-28) S559.
- Shepherd, M., Weaver, E. R., Pickering, S. F.,* Preparation of oxygen of high purity. J 22, 301 (1939) RP1182.
- Shoemaker, M. P., McKelvey, E. C.,* The two common failures of the Clark standard cell. S 16, 409 (1920) S390.
- Shoemaker, M. P., Wolff, F. A., Briggs, C. A.,* Construction of primary mercurial resistance standards. B 12, 375 (1915-16) S256.
- Shultz, H. I., Tillyer, E. D.,* Axial aberrations of lenses. B 14, 341 (1918-19) S311.
- Siegel, F., and others,* Mechanical properties of metals and alloys. C447 (1943).
- Siegel, G. L., Bates, R. G., Acree, S. F.:*
Dissociation constants and pH-titration curves at constant ionic strength from electrometric titrations in cells without liquid junction: Titrations of formic acid and acetic acid. J 30, 347 (1943) RP1537.
- The second dissociation constant of *p*-phenolsulfonic acid and pH values of phenolsulfonate-chloride buffers from 0° to 60° C. J 31, 205 (1943) RP1559.
- Sigler, P. A.,* Relative slipperiness of floor and deck surfaces. BMS100 (1943).
- Sigler, P. A., Koerner, E. A.:*
Performance test of floor coverings for use in low-cost housing: Part 1. BMS34 (1940).
Performance test of floor coverings for use in low-cost housing: Part 2. BMS43 (1940).
Performance test of floor coverings for use in low-cost housing: Part 3. BMS68 (1941).
- Sigler, P. A., Martens, R. I.,* Properties of adhesives for floor coverings. BMS59 (1940).
- Sigler, P. A., Martens, R. I., Koerner, E. A.,* Dimensional changes of floor coverings with changes in relative humidity and temperature. BMS85 (1942).
- Sigler, P. A., Woodward, M. B.:*
Indentation and recovery of low-cost floor coverings. BMS14 (1939).
Indentation characteristics of floor coverings. BMS73 (1941).
- Sillers, Jr., F., Freeman, Jr., J. R., Brandt, P. F.,* Pure zinc at normal and elevated temperatures. S 20, 661 (1924-26) S522.
- Sillers, Jr., F., Rawdon, H. S.,* Preparation and properties of pure iron alloys: III. Effect of manganese on the structure of alloys of the iron-carbon system. S 18, 637 (1922-23) S464.
- Silsbee, C. G., Jackson, R. F.:*
The solubility of dextrose in water. S 17, 715 (1922) S437.
Saturation relations in mixtures of sucrose, dextrose, and levulose. T 18, 277 (1924-25) T259.
- Silsbee, C. G., Jackson, R. F., Proffitt, M. J.,* The preparation of levulose. S 20, 587 (1924-26) S519.
- Silsbee, F. B.:*
A study of the inductance of four-terminal resistance standards. B 13, 375 (1916-17) S281.
Note on electrical conduction in metals at low temperatures. B 14, 301 (1918-19) S307.
A method for testing current transformers. B 14, 317 (1918-19) S309.
Mathematical theory of induced voltage in the high-tension magneto. S 17, 407 (1922) S424.
A shielded resistor for voltage transformer testing. S 20, 489 (1924-26) S516.
Current distribution in supraconductors. S 22, 293 (1927-28) S556.
Notes on the design of 4-terminal resistance standards for alternating currents. J 4, 73 (1930) RP133.
Composite-coil electrodynamic instruments. J 8, 217 (1932) RP411.
Static electricity. C438 (1942).
- Silsbee, F. B., Agnew, P. G.,* Accuracy of the formulas for the ratio, regulation, and phase angle of transformers. B 10, 279 (1914) S211.
- Silsbee, F. B., Brickwedde, F. G., Scott, R. B.,* Some experiments at radio frequencies on superconductors. J 20, 109 (1938) RP1070.
- Silsbee, F. B., Brooks, H. B., Defandorf, F. M.,* An absolute electrometer for the measurement of high alternating voltages. J 20, 253 (1938) RP1078.
- Silsbee, F. B., Defandorf, F. M.,* A transformer method for measuring high alternating voltages and its comparison with an absolute electrometer. J 20, 317 (1938) RP1079.
- Silsbee, F. B., Gross, F. J.,* Testing and performance of volt boxes. J 27, 269 (1941) RP1419.
- Silsbee, F. B., Randolph, D. W.,* Linkage-current diagram for representing magneto operation. S 21, 647 (1926-27) S543.
- Silsbee, F. B., Scott, R. B., Brickwedde, F. G.,* A new phenomenon in the superconducting transition of tantalum and of tin. J 18, 295 (1937) RP977.
- Silsbee, F. B., Smith, R. L., Forman, N. L., Park, J. H.,* Equipment for testing current transformers. J 11, 93 (1933) RP580.
- Silsbee, F. B., Wenner, F., Weibel, E.,* Methods of measuring the inductances of low-resistance standards. B 12, 11 (1915-16) S246.
- Simmons, R. H., Shaw, M. B.,* Printing tests of experimental book papers. J 22, 285 (1939) RP1180.

- Sinclair, S. E., Tucker, W. A.*, Creep and structural stability of nickel-chromium-iron alloys at 1,600° F. *J 10*, 852 (1933) RP572.
- Singer, G.*, Absorption of X-rays by lead glasses and lead-barium glasses. *J 16*, 233 (1936) RP870.
- Singer, G., Braestrup, C. E., Wyckoff, H. O.*, Absorption measurements for broad beams of 1- and 2-million-volt X-rays. *J 37*, 147 (1946) RP1735.
- Singer, G., Taylor, L. S.*:
The calibration of the "fingerhut" ionization chamber. *J 4*, 631 (1930) RP169.
An improved form of standard ionization chamber. *J 5*, 507 (1930) RP211.
Further studies of the X-ray standard ionization chamber diaphragm system. *J 6*, 219 (1931) RP271.
Air density corrections for X-ray ionization chambers. *J 8*, 385 (1932) RP424.
Standard absorption curves for specifying the quality of x-radiation. *J 12*, 401 (1934) RP666.
- Note on the guarded-field X-ray ionization chamber. *J 16*, 165 (1936) RP865.
- Measurement, in roentgens, of the gamma radiation from radium by the free-air ionization chamber. *J 24*, 247 (1940) RP1283.
- Singer, G., Taylor, L. S., Charlton, A. L.*:
Measurement of supervoltage X-rays with the free-air ionization chamber. *J 21*, 19 (1938) RP1111.
Concrete as a protective material against high-voltage X-rays. *J 21*, 783 (1938) RP1155.
- Singer, G., Taylor, L. S., Stoneburner, C. F.*:
Effective applied voltage as an indicator of the radiation emitted by an X-ray tube. *J 9*, 561 (1932) RP491.
A basis for the comparison of X-rays generated by voltages of different wave form. *J 11*, 293 (1933) RP592.
Comparison of high voltage X-ray tubes. *J 11*, 341 (1933) RP595.
- Singer, G., Wyckoff, H. O., Day, F. H.*, Relative thickness of lead, concrete, and steel required for protection against narrow beams of X-rays. *J 38*, 665 (1947) RP1806.
- Skillman, E.*, Some tests of steel-wire rope on sheaves. *T 17*, 227 (1922-24) T229.
- Skillman, E., Hathcock, B. D.*, Tests of hollow building tiles. *T 11*, (1918-19) T120.
- Sklar, A. L., Elliott, M. A., Acree, S. F.*, Rapid method for determining ascorbic acid concentration. *J 26*, 117 (1941) RP1364.
- Skogland, J. F.*:
A direct-reading device for use in computing characteristics of vacuum tungsten lamps. *B 12*, 269 (1915-16) S253.
Tables of spectral energy distribution and luminosity for use in computing light transmissions and relative brightnesses from spectrophotometric data. M86 (1929).
- Skogland, J. F., Middlekauff, G. W.*:
Characteristic equations of tungsten filament lamps and their application in heterochromatic photometry. *B 11*, 483 (1915) S238.
Photometry of the gas-filled lamp. *B 12*, 587 (1915-16) S264.
An interlaboratory photometric comparison of glass screens and of tungsten lamps, including color differences. *B 13*, 287 (1916-17) S277.
- Skogland, J. F., Middlekauff, G. W., Mulligan, B.*, Life testing of incandescent lamps at the Bureau of Standards. *B 12*, 605 (1915-16) S265.
- Skogland, J. F., Teele, Jr., R. P.*, Recent developments in lamp life-testing equipment and methods. *T 20*, 681 (1925-26) T325.
- Skramstad, H. K., Schubauer, G. B.*, Laminar boundary-layer oscillations and transition on a flat plate. *J 38*, 251 (1947) RP1772.
- Slater, C. S., Hall, W. L., Acree, S. F.*, Preliminary investigations upon two cellulose wastes as sources for xylose. *J 4*, 329 (1930) RP152.
- Slater, W. A., Goldbeck, A. T.*, Pouring and pressure tests of concrete. *T 14*, (1920-21) T175.
- Slater, W. A., Hagener, A., Anthes, G. P.*, Test of a hollow tile and concrete floor slab reinforced in two directions. *T 16*, 727 (1921-22) T220.
- Slater, W. A., Lord, A. R., Zippodt, R. P.*, Shear tests of reinforced concrete beams. *T 20*, 387 (1925-26) T314.
- Slater, W. A., Richart, F. E., Scofield, G. G.*, Tests of bond resistance between concrete and steel. *T 14*, (1920-21) T173.
- Slater, W. A., Seely, F. B.*, Tests of heavily reinforced concrete slab beams: Effect of direction of reinforcement on strength and deformation. *T 17*, 297 (1922-24) T233.
- Slater, W. A., Smith, G. A., Mueller, H. P.*, Effect of repeated reversals of stress on double-reinforced concrete beams. *T 14*, (1920-21) T182.
- Slattery, T. F., Hogaboom, G. B., Ham, L. B.*, "Black nickel" plating solutions. *T 15*, (1921) T190.
- Sligh, Jr., T. S.*, Recent modifications in the construction of platinum resistance thermometers. *S 17*, 409 (1922) S407.
- Sligh, Jr., T. S., Osborne, N. S., Stimson, H. F.*, A flow calorimeter for specific heats of gases. *S 20*, 119 (1924-26) S503.
- Sligh, Jr., T. S., Osborne, N. S., Stimson, H. F., Cragoe, C. S.*, Specific heat of superheated ammonia vapor. *S 20*, 65 (1924-26) S501.
- Sligh, W. H., Kessler, D. W.*:
Physical properties of the principal commercial limestones used for building construction in the United States. *T 21*, 497 (1926-27) T349.
Physical properties and weathering characteristics of slate. *J 3*, 377 (1932) RP477.
- Sligh, W. H., Kessler, D. W., Insley, H.*, Physical, mineralogical, and durability studies on the building and monumental granites of the United States. *J 25*, 161 (1940) RP1320.
- Sligh, W. H., Pearson, J. C.*, An air analyzer for determining the fineness of cement. *T 5*, (1914-15) T48.
- Sligh, W. H., Tregoning, J. J., Milliken, K. A., Hockman, A., Kessler, D. W.*, Plastic calking materials. BMS33 (1940).
- Smith, A., Wenner, F.*, Measurement of low resistance by means of the wheatstone bridge. *S 19*, 297 (1923-24) S481.
- Smith, A. H., Epstein, S. W.*, The determination of free carbon in rubber goods. *T 12*, (1919) T136.
- Smith, A. L., Harris, M.*:
Oxidation of wool: Effect of hydrogen peroxide on wool. *J 16*, 301 (1936) RP875.
Oxidation of wool: The lead acetate test for hydrogen peroxide bleached wool. *J 16*, 309 (1936) RP876.
Oxidation of wool: Photochemical oxidation. *J 17*, 97 (1936) RP904.
Oxidation of wool: Alkali-solubility test for determining the extent of oxidation. *J 17*, 577 (1936) RP928.
State of the sulfur in oxidized wool. *J 18*, 623 (1937) RP998.
Nature of the acid-dyeing process. *J 19*, 81 (1937) RP1012.
Photochemical reactions of wool. *J 20*, 563 (1938) RP1091.
- Smith, A. L., Rutherford, H. A., Harris, M.*, Estimation of amino nitrogen in insoluble proteins. *J 19*, 467 (1937) RP1038.
- Smith, D. C., Wells, L. S.*, Suitability of fiber insulating lath as a plaster base. BMS3 (1938).
- Smith, E. H., Wenner, F., Soule, F. M.*, Apparatus for the determination aboard ship of the salinity of sea water by the electrical conductivity method. *J 5*, 711 (1930) RP223.
- Smith, E. R.*:
Potential differences across the boundaries between solutions of mixed univalent chlorides. *J 2*, 1137 (1929) RP74*.
The chloroplatinate-chloroplatinite electrode. *J 5*, 735 (1930) RP225.
A method for determining the change in transference number of a salt with change in concentration. A modification of the moving boundary method. *J 6*, 917 (1931) RP314.
The determination of the coefficient of cubical expansion of solid benzoic acid by means of a gas-filled dilatometer. *J 7*, 903 (1931) RP382.
Note on the moving boundary method for measuring transference numbers. A pycnometer for determining the volume change occurring at an electrode and its application to a cathode of silver chloride in a solution of potassium chloride. *J 8*, 457 (1932) RP428.
Boiling points of n-heptane and 2,2,4-trimethylpentane over the range 100- to 1,500-millimeter pressure. *J 24*, 229 (1940) RP1280.

- Boiling points of benzene, 2,2,3-trimethylbutane, 3-ethylpentane, and 2,2,4,4-tetramethylpentane within the range 100 to 1,500 millimeters of mercury. J 26, 129 (1941) RP1365.
- Smith, E. R., Matheson, H.:**
Difference in atomic weight of oxygen from air and from water. J 17, 625 (1936) RP932.
Boiling points of benzene, ethylene chloride, n-heptane, and 2,2,4-trimethylpentane over the range 660- to 860-mm pressure. J 20, 641 (1938) RP1097.
- Smith, E. R., Matheson, H., Isbell, H. S.,** Application of the dropping-mercury electrode to the investigation of the polyhydroxy acids and lactones. J 28, 95 (1942) RP1448.
- Smith, E. R., Rodden, C. J.,** Effects of methionine, dijenkolic acid, and benzylcysteine on the estimation of cystine by the dropping mercury cathode. J 22, 669 (1939) RP1211.
- Smith, E. R., Schwab, F. W.,** Calculation of temperatures in platinum resistance thermometry. J 34, 360 (1945) Appendix to RP1647.
- Smith, E. R., Swietoslawski, W.,** Water as a reference standard for ebulliometry. J 20, 549 (1938) RP1088.
- Smith, E. R., Taylor, J. K.:**
Reproducibility of the silver-silver chloride electrode. J 20, 837 (1938) RP1108.
Reproducibility of silver-silver halide electrodes. J 22, 307 (1939) RP1183.
Standard electrode potential of sodium. J 25, 731 (1940) RP1350.
- Smith, E. R., Taylor, J. K., Smith, R. E.,** Effect of reaction between mercury and oxygen upon polarographic waves of certain metals at small concentrations. J 37, 151 (1946) RP1736.
- Smith, E. R., Washburn, E. W.:**
Note on an electrical conductance method for determining liquefaction temperatures of solids. J 2, 787 (1929) RP57.
An examination of water from various natural sources for variations in isotopic composition. J 12, 305 (1934) RP556.
- Smith, E. R., Washburn, E. W., Frandsen, M.,** The isotopic fractionation of water. J 11, 453 (1933) RP601.
- Smith, E. R., Washburn, E. W., Smith, F. A.,** Fractionation of the isotopes of hydrogen and of oxygen in a commercial electrolyzer. J 13, 599 (1934) RP729.
- Smith, E. R., Wojciechowski, M.:**
Fractionation of the isotopes of oxygen in a commercial electrolyzer — a correction. J 15, 187 (1935) RP820.
Boiling-point-composition diagram for dilute aqueous solutions of deuterium oxide. J 17, 841 (1936) RP947.
Boiling-point-composition diagram of the system dioxane-water. J 18, 461 (1937) RP985.
Boiling points and densities of acetates of normal aliphatic alcohols. J 18, 499 (1937) RP989.
- Smith, F. A., Eisman, J. H.:**
Effect of the depth of drilled ports on the limits of operation of domestic gas burners. J 18, 485 (1937) RP988.
Saturation of gases by laboratory wet test meters. J 23, 345 (1939) RP1238.
- Smith, F. A., Eisman, J. H., Creitz, E. C.,** Tests of instruments for the determination, indication, or recording of the specific gravities of gases. M 177 (1947).
- Smith, F. A., Eisman, J. H., Merritt, C. J.,** The effect of altitude on the limits of safe operation of gas appliances. J 10, 619 (1933) RP553.
- Smith, F. A., Eisman, J. H., Weaver, E. R.,** A method for determining the most favorable design of gas burners. J 8, 699 (1932) RP446.
- Smith, F. A., Pickering, S. F.:**
Bunsen flames of unusual structure. J 3, 65 (1929) RP84.
Measurements of flame velocity by a modified burner method. J 17, 7 (1936) RP900.
- Smith, F. A., Washburn, E. W., Smith, E. R.,** Fractionation of the isotopes of hydrogen and of oxygen in a commercial electrolyzer. J 13, 599 (1934) RP729.
- Smith, G. A., Slater, W. A., Mueller, H. P.,** Effect of repeated reversals of stress on double-reinforced concrete beams. T 14, (1920-21) T182.
- Smith, L., Martin, A. R., Whistler, R. L., Harris, M.,** Estimation of aldehyde groups in hydrocellulose from cotton. J 27, 449 (1941) RP1432.
- Smith, N.:**
Extension of normal-incidence ionosphere measurements to oblique-incidence radio transmission. J 19, 89 (1937) RP1013.
Application of vertical-incidence ionosphere measurements to oblique-incidence radio transmission. J 20, 683 (1938) RP1100.
Predictions of normal radio critical frequencies related to solar eclipses in 1940. J 24, 225 (1940) RP1279.
Oblique-incidence radio transmission and the Lorentz polarization term. J 26, 105 (1941) RP1363.
- Smith, N., Gilliland, T. R., Kirby, S. S.,** Trends of characteristics of the ionosphere for half a sunspot cycle. J 21, 835 (1938) RP1159.
- Smith, N., Gilliland, T. R., Kirby, S. S., Reymer, S. E.:**
Characteristics of the ionosphere and their application to radio transmission. J 18, 645 (1937) RP1001.
Maximum usable frequencies for radio sky-wave transmission, 1933 to 1937. J 20, 627 (1938) RP1096.
- Smith, N., Kirby, S. S., Gilliland, T. R.,** Application of graphs of maximum usable frequency to communication problems. J 22, 81 (1939) RP1167.
- Smith, R. E., Smith, E. R., Taylor, J. K.,** Effect of reaction between mercury and oxygen upon polarographic waves of certain metals at small concentrations. J 37, 151 (1946) RP1736.
- Smith, R. L., Silsbee, F. B., Forman, N. L., Park, J. H.,** Equipment for testing current transformers. J 11, 93 (1933) RP580.
- Smith, R. W.:**
Legal weights per bushel for various commodities. C425 (1940).
Weights and measures administration. H11 (1927).
Weights and measures administration. H26 (1941).
Specifications, tolerances, and regulations for commercial weighing and measuring devices. H29 (1942).
Testing of weighing equipment. H37 (1945).
Weights and measures references. Including an index to the reports of the national conference on weights and measures from the first to the twenty-first, inclusive. M103 (1930).
Testing equipment for large-capacity scales for the use of weights and measures officials. M104 (1936).
- Smith, R. W., McCormac, W. T.,** Index to the reports of the National Conference on Weights and Measures (1905-41). M172. (1942).
- Smith, T. T.,** Spherical aberration of thin lenses. S 18, 559 (1922-23) S461.
- Smith, T. T., Bennett, A. H., Merritt, G. E.,** Characteristics of striae in optical glass. S 16, 75 (1920) S373.
- Smith, W. H.:**
Recovery of paraffin and paper stock from waste paraffin paper. T 9, (1916-17) T87.
Studies on paper pulps. T 9, (1916-17) T88.
- Smith, W. H., Clark, G. L., Gross, S. T.:**
X-ray diffraction patterns of crystalline sol rubber prepared from ethereal solution. J 22, 105 (1939) RP1170.
X-ray diffraction patterns of Hevea, Manihot, and other rubbers. J 23, 1 (1939) RP1218.
- Smith, W. H., Clark, G. L., Wolhuis, E.,** X-ray diffraction patterns of sol, gel, and total rubber when stretched and when crystallized by freezing from solutions. J 19, 479 (1937) RP1039.
- Smith, W. H., Hanna, N. P.,** Comparison between the observed density of crystalline rubber and the density calculated from X-ray data. J 27, 229 (1941) RP1416.
- Smith, W. H., Holt, W. L.,** Vulcanization and stress-strain behavior of sol, gel, and total rubber hydrocarbon. J 13, 465 (1934) RP720.
- Smith, W. H., Saylor, C. P.:**
Ether-insoluble or gel rubber hydrocarbon, its solution, crystallization, and properties. J 13, 453 (1934) RP719.
Optical and dimensional changes which accompany the freezing and melting of Hevea rubber. J 21, 257 (1938) RP1129.

- Smith, W. H., Saylor, C. P., Wing, H. J., The preparation and crystallization of pure ether-soluble rubber hydrocarbon: Composition, melting point, and optical properties. *J* 10, 479 (1933) RP544.
- Smith, W. H., Scherrer, J. A., Preparation of ammonium aurintricarboxylate. *J* 21, 113 (1938) RP1118.
- Smith, W. H., Tener, R. F., Holt, W. L., Aging of soft rubber goods. *T* 21, 353 (1926-27) T342.
- Smith, W. H., Tuttle, J. B.: Iodine number of linseed and petroleum oils. *T* 4, (1913-14) T37.
- Analysis of printing inks. *T* 4, (1913-14) T39.
- Smith, W. H., Wing, H. J., Behavior of rubber hydrocarbon in a molecular still. *J* 22, 529 (1939) RP1202.
- Smith, W. O., Stair, R., A tungsten-in-quartz lamp and its applications in photoelectric radiometry. *J* 30, 449 (1943) RP1543.
- Smither, F. W.: Washing, cleaning, and polishing materials. *C*383 (1930).
- Washing, cleaning, and polishing materials. *C*424 (1939).
- Smither, F. W., McGowan, F. R., Schoffstall, C. W., Performance tests of a liquid laundry soap used with textile materials. *T* 19, 1 (1924-25) T273.
- Smither, F. W., Walker, P. H., Comparative tests of chemical glassware. *T* 10, (1917-18) T107.
- Smock, A. W., Shartis, L., Surface tensions of some optical glasses. *J* 33, 241 (1947) RP1771.
- Snoke, H. R., Asphalt-prepared roll roofings and shingles. *BMS*70 (1941).
- Snoke, H. R., Gallup, B. E., Accelerated weathering tests of mineral-surfaced asphalt shingles. *J* 18, 669 (1937) RP1002.
- Snoke, H. R., Streiter, O. G., A modified accelerated weathering test for asphalts and other materials. *J* 16, 481 (1936) RP886.
- Snoke, H. R., Waldron, L. J.: Survey of roofing materials in the southeastern States. *BMS*6 (1938).
- Survey of roofing materials in the Northeastern States. *BMS*29 (1939).
- Roofing in the United States — Results of a questionnaire. *BMS*57 (1940).
- Survey of roofing materials in the North Central States. *BMS*75 (1941).
- Survey of roofing materials in the South Central States. *BMS*84 (1942).
- Snow, C.: Spectroradiometric analysis of radio signals. *S* 19, 231 (1923-24) S477.
- Alternating current distribution in cylindrical conductors. *S* 20, 277 (1924-26) S509.
- Formula for the inductance of a helix made with wire of any section. *S* 21, 431 (1926-27) S537.
- Electric field of a charged wire and a slotted cylindrical conductor. *S* 21, 631 (1926-27) S542.
- Effect of eddy currents in a core consisting of circular wires. *S* 21, 701 (1926-27) S544.
- Indeterminateness of electrical charge. *S* 22, 547 (1927-28) S566.
- Effect of clearance and displacement of attracted disk, and also of a certain arrangement of conducting hoops, upon the constant of an electrometer. *J* 1, 513 (1928) RP17.
- Mutual inductance of any two circles. *J* 1, 531 (1928) RP18.
- Mutual inductance and torque between two concentric solenoids. *J* 1, 685 (1928) RP24.
- The mutual inductance of two parallel circles. *J* 3, 255 (1929) RP94.
- The effect of small variations in pitch upon the inductance of a solenoid. *J* 6, 777 (1931) RP304.
- Elastic problem of a wire-wound cylinder. *J* 7, 331 (1931) RP344.
- A simplified precision formula for the inductance of a helix with corrections for the lead-in wires. *J* 9, 419 (1932) RP479.
- The attraction between coils in the Rayleigh current balance. *J* 11, 681 (1933) RP615.
- Drop of potential in the metallic electrodes of certain electrolytic cells. *J* 17, 101 (1936) RP905.
- Mutual inductance and force between two coaxial helical wires. *J* 22, 239 (1939) RP1178.
- An addition to the derivation of the force formula to include some terms of the sixth degree in the coil dimensions. Appendix I, *J* 22, 512 (1939) RP1200.
- Correction to the force caused by an axial displacement of some of the turns in the coils made from aluminum ribbon. Appendix II, *J* 22, 516 (1939) RP1200.
- Torque between concentric single-layer coils. *J* 22, 607 (1939) RP1208.
- Theory of a single-layer, bifilar, absolute standard of mutual inductance. *J* 24, 597 (1940) RP1302.
- Mutual inductance of two helices whose axes are parallel. *J* 25, 619 (1940) RP1346.
- Snow, C. L., Freehafer, M. K., Tables and graphs for facilitating the computation of spectral energy distribution by Planck's formula. *M*56 (1925).
- Snyder, C. F., Temperature corrections to readings of Baumné hydrometers, Bureau of Standards Baumné scale for sugar solutions (standard at 20° C.). *C*295 (1926).
- Snyder, C. F., Hammond, L. D.: Note on the determination of weight per gallon of blackstrap molasses. *T* 21, 409 (1926-27) T345.
- Weights per United States Gallon and weights per cubic foot of sugar solutions. *C*375 (1929).
- Weights per United States gallon and weights per cubic foot of sugar solutions. *C*457 (1946).
- Snyder, C. L., Measurement of electrical resistance and mechanical strength of storage-battery separators. *T* 18, 619 (1924-25) T271.
- Snyder, C. L., Vinal, G. W., Oscillograph measurements of the instantaneous values of current and voltage in the battery circuit of automobiles. *T* 15, (1921) T186.
- Snyder, C. L., Vinal, G. W., Craig, D. N.: Composition of grids for positive plates of storage batteries as a factor influencing the sulphation of negative plates. *J* 10, 795 (1933) RP567.
- Note on the effects of cobalt and nickel in storage batteries. *J* 25, 417 (1940) RP1335.
- Snyder, L. W., Carson, F. T., Calibration and adjustment of the Schopper folding tester. *T* 22, 125 (1927-28) T357.
- Snyder, L. W., Shaw, M. B., Bicking, G. W., The preparation of fiber test sheets. *J* 5, 105 (1930) RP190.
- Snyder, L. W., Weber, C. G., Reactions of lithographic papers to variations in humidity and temperature. *J* 12, 53 (1934) RP633.
- Snyder, L. W., Weber, C. G., Carson, F. T., Properties of fiber building boards. *M*132 (1931).
- Snyder, W. F.: An automatic reverberation meter for the measurement of sound absorption. *J* 9, 47 (1932) RP457.
- Acoustic performance of 16-millimeter sound motion-picture projectors. *C*439 (1942).
- Snyder, W. F., Chrisler, V. L.: Transmission of sound through wall and floor structures. *J* 2, 541 (1929) RP48.
- Sound-proofing of airplane cabins. *J* 2, 897 (1929) RP63.
- The measurement of sound absorption. *J* 5, 957 (1930) RP242.
- Recent sound-transmission measurements at the National Bureau of Standards. *J* 14, 749 (1935) RP800.
- Snyder, W. F., Heyl, P. R., Chrisler, V. L., The absorption of sound at oblique angles of incidence. *J* 4, 289 (1930) RP149.
- Solakian, H. N., Freeman, Jr., J. R., Effect of service on the endurance properties of rail steel. *J* 3, 205 (1929) RP92.
- Sookne, A. M., Beek, Jr., J., Electrophoresis of collagen. *J* 23, 271 (1939) RP1230.
- Sookne, A. M., Fugitt, C. H., Steinhardt, J., Electrolytic estimation of ash and of acidic and basic groups in textile fibers. *J* 25, 61 (1940) RP1314.
- Sookne, A. M., Harris, M.: Stress-strain characteristics of wool as related to its chemical constitution. *J* 19, 535 (1937) RP1043.
- Electrophoretic studies of silk. *J* 23, 299 (1939) RP1234.
- Electrophoretic studies of wool. *J* 23, 471 (1939) RP1245.

- Relation of cation exchange to the acidic properties of cotton. *J 25*, 47 (1940) RP1313.
- Surface characteristics of cotton fibers, as indicated by electrophoretic studies. *J 26*, 65 (1941) RP1359.
- Base-combining capacity of cotton. *J 26*, 205 (1941) RP1370.
- Electrophoretic studies of nylon. *J 26*, 289 (1941) RP1376.
- Mechanical properties of cellulose acetate as related to molecular chain length. *J 30*, 1 (1943) RP1513.
- Intrinsic viscosities and osmotic molecular weights of cellulose acetate fractions. *J 34*, 459 (1945) RP1654.
- Polymolecularity and mechanical properties of cellulose acetate. *J 34*, 467 (1945) RP1655.
- Sookne, A. M., Hock, C. W., Harris, M., Thermal properties of moist fabrics. *J 32*, 229 (1944) RP1587.
- Sookne, A. M., Rutherford, H. A., Autographic load-elongation apparatus for fibers. *J 31*, 25 (1943) RP1546.
- Sookne, A. M., Rutherford, H. A., Mark, H., Harris, M., Fractionation of cellulose acetate. *J 29*, 123 (1942) RP1490.
- Sookne, A. M., Weber, C. G., Stability of the viscose type of Ozaphane photographic film. *J 21*, 347 (1938) RP1134.
- Soroos, H., White, J. D., Rose, Jr., F. W., Calingaert, G., 2,6-Dimethylheptane: Its synthesis, properties, and comparison with an isononane from petroleum. *J 22*, 315 (1939) RP1184.
- Sortwell, H. H.: High fire porcelain glazes. *T 15*, (1921) T196.
- American and English ball clays. *T 17*, 153 (1922-24) T227.
- Souder, W. H., Hidnert, P.: Thermal expansion of insulating materials. *S 15*, 387 (1919-20) S352.
- Thermal expansion of nickel, monel metal, stellite, stainless steel, and aluminum. *S 17*, 497 (1922) S426.
- Thermal expansion of a few steels. *S 17*, 611 (1922) S433.
- Measurements on the thermal expansion of fused silica. *S 21*, 1 (1926-27) S524.
- Souder, W. H., Hidnert, P., Fox, J. F., Autographic thermal expansion apparatus. *J 13*, 497 (1934) RP722.
- Souder, W. H., Peters, C. G., An investigation of the physical properties of dental materials. *T 13*, (1919-20) T157.
- Souder, W. H., Schoonover, I. C., Abrasion and solution of teeth. *J 31*, 247 (1943) RP1563.
- Soule, F. M., Wenner, F., Smith, E. H., Apparatus for the determination aboard ship of the salinity of sea water by the electrical conductivity method. *J 5*, 711 (1930) RP223.
- Sparks, C. M., Curtis, H. L., Formulas, tables, and curves for computing the mutual inductance of two coaxial circles. *S 19*, 541 (1923-24) S492.
- Sparks, C. M., Curtis, H. L., Hartshorn, L., Astbury, N. F., Capacitance and power factor of a mica capacitor as measured at the Bureau of Standards and the National Physical Laboratory. *J 8*, 507 (1932) RP431.
- Sparks, C. M., Curtis, H. L., Moon, C.: An absolute determination of the ohm. *J 16*, 1 (1936) RP857.
- A determination of the absolute ohm, using an improved self inductor. *J 21*, 375 (1938) RP1137.
- Spence, D., Boon, C. E., Some vulcanization tests of guayule rubber. *T 22*, 1 (1927-28) T353.
- Sperling, E. O., Branham, J. R., Bubbler tip of Pyrex glass for difficult absorptions. *J 22*, 701 (1939) RP1214.
- Sperling, E. O., Shepherd, M., A manometric gas analysis apparatus. *J 26*, 341 (1941) RP1380.
- Spinks, A. W., Brooks, H. B., A multirange potentiometer and its application to the measurement of small temperature differences. *J 9*, 781 (1932) RP506.
- Squier, G. O., Crehore, A. C., Note on oscillatory interference bands and some of their practical applications. *B 7*, 131 (1911) S150.
- Stair, R., A precision radio instrument for transmitting measurements of ultraviolet intensities from unmanned balloons to a ground station. *J 22*, 295 (1939) RP1181.
- Stair, R., Coblenz, W. W.: Transmissive properties of eye-protective glasses and other substances. *T 22*, 555 (1927-28) T369.
- Reflecting power of beryllium, chromium, and several other metals. *J 2*, 343 (1929) RP39.
- Data on ultraviolet solar radiation and the solarization of window materials. *J 3*, 629 (1929) RP113.
- Ultraviolet reflecting power of aluminum and several other metals. *J 4*, 189 (1930) RP141.
- Measurement of extreme ultraviolet solar radiation by a filter method. *J 6*, 951 (1931) RP318.
- The present status of the standards of thermal radiation maintained by the Bureau of Standards. *J 11*, 79 (1933) RP578.
- Infrared absorption spectra of some plant pigments. *J 11*, 703 (1933) RP617.
- Data on the spectral erythemal reaction of the untanned human skin to ultraviolet radiation. *J 12*, 13 (1934) RP631.
- A portable ultraviolet intensity meter, consisting of a balanced amplifier, photoelectric cell, and microammeter. *J 12*, 231 (1934) RP647.
- Ultraviolet transmission changes in glass as a function of the wave length of the radiation stimulus. *J 13*, 773 (1934) RP744.
- Factors affecting ultraviolet solar-radiation intensities. *J 15*, 123 (1935) RP816.
- Infrared absorption spectra of plant and animal tissue and of various other substances. *J 15*, 295 (1935) RP830.
- A standard source of ultraviolet radiation for calibrating photo-electric dosage intensity meters. *J 16*, 83 (1936) RP859.
- Evaluation of ultraviolet solar radiation of short wave lengths. *J 16*, 315 (1936) RP877.
- Distribution of the energy in the extreme ultraviolet of the solar spectrum. *J 17*, 1 (1936) RP899.
- Radiometric measurements of ultraviolet solar intensities in the stratosphere. *J 20*, 185 (1938) RP1075.
- Note on the spectral reflectivity of rhodium. *J 22*, 93 (1939) RP1168.
- Distribution of ozone in the stratosphere. *J 22*, 573 (1939) RP1207.
- Distribution of ozone in the stratosphere: Measurements of 1939 and 1940. *J 26*, 161 (1941) RP1367.
- Measurements of ultraviolet radiation in Washington, 1936 to 1942. *J 30*, 434 (1943) RP1542.
- A daily record of ultraviolet solar and sky radiation in Washington, 1941 to 1943. *J 33*, 21, (1944) RP1593.
- Spectral-transmissive properties and use of colored eye-protective glasses. C421 (1938).
- Stair, R., Coblenz, W. W., Gracely, F. R., Measurements of ultraviolet solar- and sky-radiation intensities in high latitudes. *J 28*, 581 (1942) RP1469.
- Stair, R., Coblenz, W. W., Hogue, J. M.: A balanced thermocouple and filter method of ultraviolet radiometry with practical applications. *J 7*, 723 (1931) RP370.
- The spectral erythemal reaction of the untanned human skin to ultraviolet radiation. *J 8*, 541 (1932) RP433.
- Tests of a balanced thermocouple and filter radiometer as a standard ultraviolet dosage intensity meter. *J 8*, 759 (1932) RP450.
- Measurements of ultra-violet solar radiation in various localities. *J 10*, 79 (1933) RP517.
- Stair, R., Coblenz, W. W., Schoffstall, C. W., Some measurements of the transmission of ultra-violet radiation through various kinds of fabrics. *J 1*, 105 (1928) RP6.
- Stair, R., Faick, C. A., Infrared absorption of some experimental glasses containing rare earth and other oxides. *J 38*, 95 (1947) RP1761.
- Stair, R., Plyler, E. K., Humphreys, C. J., Infrared absorption spectra of twelve cyclopentanes and cyclohexanes. *J 38*, 211 (1947) RP1769.
- Stair, R., Smith, W. O., A tungsten-in-quartz lamp and its applications in photoelectric radiometry. *J 30*, 449 (1943) RP1543.
- Stair, R., Tool, A. Q., The restoration of solarized ultra-violet transmitting glasses by heat treatment. *J 7*, 357 (1931) RP345.

- Staley, H. F.:*
Materials and methods used in the manufacture of enameled cast-iron wares. T 12, (1919) T142.
Cements for spark-plug electrodes. T 13, (1919-20) T155.
- Stang, A. H.,* A portable apparatus for transverse tests of brick. T 21, 347 (1926-27) T341.
- Stang, A. H., Edwards, J. H., Whittemore, H. L.:*
Transverse tests of H-section column splices. J 4, 395 (1930) RP157.
Compressive tests of bases for subway columns. J 5, 619 (1930) RP218.
Strength of welded shelf-angle connections. J 5, 781 (1930) RP230.
Stress distribution in welded steel pedestals. J 5, 803 (1930) RP232.
Compressive tests of jointed H-section steel columns. J 6, 305 (1931) RP277.
- Stang, A. H., Fulweiler, W. H., Sweetman, L. R.,* Inspection and tensile tests of some worn wire ropes. J 17, 401 (1936) RP920.
- Stang, A. H., Greene, T. W.,* Stresses in a few welded and riveted tanks tested under hydrostatic pressure. T 17, 645 (1922-24) T243.
- Stang, A. H., Greenspan, M.:*
Graphical computation of stresses from strain data. J 19, 437 (1937) RP1034.
Strength of a welded steel rigid frame. J 23, 145 (1939) RP1224.
Perforated cover plates for steel columns: Program and test methods. J 28, 669 (1942) RP1473.
Perforated cover plates for steel columns: Compressive properties of plates having ovaloid perforations and a width-to-thickness ratio of 40. J 28, 687 (1942) RP1474.
Perforated cover plates for steel columns: Compressive properties of plates having ovaloid perforations and a width-to-thickness ratio of 68. J 29, 279 (1942). RP1501.
Perforated cover plates for steel columns: Compressive properties of plates having ovaloid perforations and a width-to-thickness ratio of 53. J 30, 15 (1943) RP1514.
Perforated cover plates for steel columns: Compressive properties of plates having circular perforations and a width-to-thickness ratio of 53. J 30, 177 (1943) RP1527.
Perforated cover plates for steel columns: Compressive properties of plates having a net-to-gross cross-sectional-area ratio of 0.33. J 30, 411 (1943) RP1540.
- Stang, A. H., Greenspan, M., Neuman, S. B.:*
Dynamic tensile tests of parachute webbing. J 36, 411 (1946) RP1710.
Poisson's ratio of some structural alloys for large strains. J 37, 211 (1946) RP1742.
- Stang, A. H., Greenspan, M., Osgood, W. R.:*
Strength of a riveted steel rigid frame having straight flanges. J 21, 269 (1938) RP1130.
Strength of a riveted steel rigid frame having a curved inner flange. J 21, 853 (1938) RP1161.
- Stang, A. H., Harris, A. L., McBurney, J. W.,* Compressive strength of steel columns incased in brick walls. J 10, 123 (1933) RP520.
- Stang, A. H., Lyon, W. C., Whittemore, H. L., Sweetman, L. R.,* Strain measurement in the reinforcement for the dome of the Natural History Building. J 6, 183 (1931) RP268.
- Stang, A. H., Parsons, D. E.:*
Tests of hollow tile and concrete slabs reinforced in one direction. T 19, 465 (1924-25) T291.
Tests of composite beams and slabs of hollow tile and concrete. J 4, 815 (1930) RP181.
- Stang, A. H., Parsons, D. E., Foster, H. D.,* Compressive and transverse strength of hollow tile walls. T 20, 307 (1925-26) T311.
- Stang, A. H., Parsons, D. E., McBurney, J. W.:*
Compressive strength of clay brick walls. J 3, 507 (1929) RP108.
Shear tests of reinforced brick masonry beams. J 9, 749 (1932) RP504.
- Stang, A. H., Parsons, D. E., McDaniel, A. B.,* Strength of interlocking-rib tile walls. T 22, 389 (1927-28) T366.
- Stang, A. H., Strickenberg, L. R.:*
Results of some tests of manila rope. T 15, (1921) T198.
Results of some compression tests of structural steel angles. T 16, 651 (1921-22) T218.
- Stang, A. H., Sweetman, L. R.:*
An extensometer comparator. J 15, 199 (1935) RP822.
Accelerated service tests of pintle bearings. J 15, 591 (1935) RP854.
Load distribution and strength of elevator cable equalizers. J 17, 291 (1936) RP912.
- Stang, A. H., Sweetman, L. R., Gough, C.,* The areas and tensile properties of deformed concrete-reinforcement bars. J 9, 509 (1932) RP486.
- Stang, A. H., Tuckerman, L. B.,* Tests of large columns with H-shaped sections. T 21, 1 (1926-27) T328.
- Stang, A. H., Tuckerman, L. B., Osgood, W. R.,* Test of a flat steel-plate floor under loads. J 12, 363 (1934) RP662.
- Stang, A. H., Whittemore, H. L.:*
Compressive strength of sand-lime brick walls. T 19, 57 (1924-25) T276.
Tests of some girder hooks. T 18, 305 (1924-25) T360.
Tests of steel tower columns for the George Washington Bridge. J 15, 317 (1935) RP831.
Methods of determining the structural properties of low-cost house constructions. BMS2 (1938).
- Stang, A. H., Whittemore, H. L., Cotter, J. B., Phelan, V. B.,* Strength of houses: application of engineering principles to structural design. BMS109 (1947).
- Stang, A. H., Whittemore, H. L., Fishburn, C. C.:*
Structural properties of one of the "Keystone beam steel floor" constructions sponsored by the H. H. Robertson Company. BMS10 (1938).
Structural properties of a "Tilecrete" floor construction sponsored by Tilecrete Floors, Inc., BMS16 (1939).
Structural properties of a reinforced-brick wall construction and a brick-tile cavity-wall construction sponsored by the Structural Clay Products Institute. BMS24 (1939).
Structural properties of "Nelson Pre-Cast Concrete Foundation" wall construction sponsored by the Nelson Cement Stone Company, Inc., BMS26 (1939).
Structural properties of a wall construction of "Knap Concrete Wall Units" sponsored by Knap America, Inc. BMS40 (1940).
- Stang, A. H., Whittemore, H. L., Heck, G. E.,* Structural properties of "Precision-Built" frame wall and partition constructions sponsored by the Homasote Co. BMS48 (1940).
- Stang, A. H., Whittemore, H. L., Hubbell, E., Dill, R. S.,* Structural, heat-transfer, and water-permeability properties of five earth-wall constructions. BMS78 (1941).
- Stang, A. H., Whittemore, H. L., Parsons, D. E.:*
Structural properties of six masonry wall constructions. BMS5 (1938).
Structural properties of "Twachtman" constructions for walls and floors sponsored by Connecticut Pre-Cast Buildings Corporation. BMS20 (1939).
Structural properties of a concrete-block cavity-wall construction sponsored by the National Concrete Masonry Association. BMS21 (1939).
Structural properties of "Dun-Ti-Stone" wall construction sponsored by the W. E. Dunn Manufacturing Company. BMS22 (1939).
Structural properties of a brick cavity-wall construction sponsored by the Brick Manufacturers Association of New York, Inc. BMS23 (1939).
Structural properties of two brick-concrete-block wall constructions and a concrete-block wall construction sponsored by the National Concrete Masonry Association. BMS32 (1939).
Structural properties of two "Dunstone" wall constructions sponsored by the W. E. Dunn Manufacturing Co. BMS38 (1940).
Structural properties of a wall construction of "Pfeifer Units" sponsored by the Wisconsin Units Company. BMS39 (1940).
Structural properties of "Tilecrete Type A" floor construction sponsored by the Tilecrete Co. BMS51 (1940).
Structural properties of a masonry wall construction of "Munlock Dry Wall Brick" sponsored by the Munlock Engineering Co. BMS53 (1940).

- Structural properties of two non-reinforced monolithic concrete wall constructions. BMS61 (1940).
- Structural properties of a precast joist concrete floor construction sponsored by the Portland Cement Association. BMS62 (1940).
- Some tests of steel columns incased in concrete. J 16, 265 (1936) RP873.
- Stang, A. H., Whittemore, H. L., Phelan, V. B.: Structural properties of the Insulated Steel Construction Company's "Frameless-Steel" constructions for walls, partitions, floors, and roofs. BMS9 (1938).
- Structural properties of the Curran Fabrihome Corporation's "Fabrihome" constructions for walls and partitions. BMS11 (1938).
- Structural properties of "Steelox" constructions for walls, partitions, floors, and roofs sponsored by Steel Buildings, Inc. BMS12 (1939).
- Structural properties of "Wheeling Long-Span Steel Floor" construction sponsored by the Wheeling Corrugating Company. BMS15 (1939).
- Structural properties of "Pre-Fab" constructions for walls, partitions, and floors sponsored by the Harnischfeger Corporation. BMS18 (1939).
- Structural properties of "Bender Steel Home" wall construction sponsored by The Bender Body Company. BMS27 (1939).
- Structural properties of "Scot-Bilt" prefabricated sheet steel constructions for walls, floors, and roofs sponsored by the Globe-Wernicke Co. BMS46 (1940).
- Structural properties of "Mu-Steel" prefabricated sheet-steel constructions for walls, partitions, floors, and roofs sponsored by Herman A. Mugler. BMS67 (1941).
- Stang, A. H., Whittemore, H. L., Phelan, V. B., Dill, R. S.: Structural and heat-transfer properties of "U. S. S. Panelbilt" prefabricated sheet-steel constructions for walls, partitions, and roofs sponsored by the Tennessee Coal, Iron & Railroad Co. BMS74 (1941).
- Stang, A. H., Whittemore, H. L., Sweetman, L. R.: Tests of eight large H-shaped columns fabricated from carbon-manganese steel. J 16, 595 (1936) RP896.
- Tests of steel chord members for the Bayonne Bridge. J 16, 627 (1936) RP897.
- Stang, A. H., Whittemore, H. L., Wilson, T. R. C.: Structural properties of a wood-frame wall construction sponsored by the Douglas Fir Plywood Association. BMS30 (1939).
- Structural properties of "Insulite" wall and "Insulite" partition constructions sponsored by The Insulite Company. BMS31 (1939).
- Structural properties of wood-frame wall, partition, floor, and roof constructions with "Red Stripe" lath sponsored by The Weston Paper & Manufacturing Co. BMS36 (1940).
- Structural properties of "Palisade Homes" constructions for walls, partitions, and floors, sponsored by Palisade Homes. BMS37 (1940).
- Structural properties of wood-frame wall and partition constructions with "Celotex" insulating boards sponsored by The Celotex Corporation. BMS42 (1940).
- Structural properties of prefabricated wood-frame constructions for walls, partitions, and floors sponsored by American Houses, Inc. BMS47 (1940).
- Stannard, W. H., Agnew, P. G., Fearing, J. L., A system of remote control for an electric testing laboratory. B 13, 581 (1916-17) S291.
- Staples, E. M., Dowdell, R. L., Eggenchwiler, C. E.: Bearing bronzes with additions of zinc, phosphorus, nickel, and antimony. J 5, 349 (1930) RP205.
- Staples, E. M., French, H. J.: Bearing bronzes with and without zinc. J 2, 1017 (1929) RP68.
- Steele, L. L., Walker, P. H.: Slushing oils. T 14, (1920-21) T176.
- Shellac. T 17, 277 (1922-24) T232.
- Steierman, B. L., Geller, R. F., Yavorsky, P. J., Creamer, A. S.: Studies of binary and ternary combinations of magnesia, calcia, baria, beryllia, alumina, thoria, and zirconia in relation to their use as porcelains. J 36, 277 (1946) RP1703.
- Steierman, B. L., Insley, H., Parsons, W. H.: Size grading of diamond powders. J 36, 469 (1946) RP1716.
- Steinhardt, J.: Calculation of protein-anion affinity constants from acid titration data. J 23, 191 (1942) RP1452.
- Analysis of the selective combination of wool with acids in mixtures. J 29, 425 (1942) RP1511.
- Steinhardt, J., Fugitt, C. H.: Catalyzed hydrolysis of amide and peptide bonds in proteins. J 29, 315 (1942) RP1503.
- Steinhardt, J., Fugitt, C. H., Harris, M.: Combination of wool protein with acid and base: The effect of temperature on the titration curve. J 25, 519 (1940) RP1343.
- Relative affinities of the anions of strong acids for wool protein. J 26, 293 (1941) RP1377.
- Further investigations of the affinities of strong acids for wool proteins. J 28, 201 (1942) RP1453.
- Combination of wool protein with acids in mixtures, and its relation to the acid dyeing of wool. J 29, 417 (1942) RP1510.
- Combination of wool protein with weak acids. J 30, 123 (1943) RP1523.
- Steinhardt, J., Harris, M.: Combination of wool protein with acid and base: Hydrochloric acid and potassium hydroxide. J 24, 335 (1940) RP1286.
- Steinhardt, J., Sookne, A. M., Fugitt, C. H.: Electrolytic estimation of ash and of acidic and basic groups in textile fibers. J 25, 61 (1940) RP1314.
- Stephens, R. E., Harrison, W. N., Shelton, S. M.: Consistency of eight types of vitreous enamel frits at and near firing temperatures. J 20, 39 (1938) RP1063.
- Stevens, H. T., Schiefer, H. F., Mack, P. B., Boyland, P. M.: A study of the properties of household blankets. J 32, 261 (1944) RP1589.
- Stevens, R. E., Hamm, H. A.: A method of measuring the stress-strain relations of wet textiles with application to wet rayons. J 3, 927 (1929) RP122.
- Stillman, M. H.: Note on the setting of a mercury surface to a required height. B 10, 371 (1914) S214.
- The damping of waves and other disturbances in mercury. B 13, 563 (1916-17) S289.
- A photographic method of detecting changes in a complicated group of objects. S 16, 437 (1920) S392.
- A portable cubic-foot standard for gas. T 11, (1918-19) T114.
- Stimson, F. J., Meggers, W. F., Kiess, C. C.: Practical spectrographic analysis. S 13, 235 (1922-23) S444.
- Stimson, H. F., Mohler, F. L., Foote, P. D.: Ionization and resonance potentials for electrons in vapors of lead and calcium. S 15, 723 (1919-20) S368.
- Stimson, H. F., Mueller, E. F.: A temperature-control box for saturated standard cells. J 13, 699 (1934) RP739.
- Stimson, H. F., Osborne, N. S., Fiock, E. F.: A calorimetric determination of thermal properties of saturated water and steam from 0° to 270° C. J 5, 411 (1930) RP209.
- Stimson, H. F., Osborne, N. S., Fiock, E. F., Ginnings, D. C.: The pressure of saturated water vapor in the range 100° to 374° C. J 10, 155 (1933) RP523.
- Stimson, H. F., Osborne, N. S., Ginnings, D. C.: Calorimetric determination of the thermodynamic properties of saturated water in both the liquid and gaseous states from 100° to 374° C. J 18, 389 (1937) RP983.
- Measurements of heat capacity and heat of vaporization of water in the range 0° to 100° C. J 23, 197 (1939) RP1228.
- Thermal properties of saturated water and steam. J 23, 261 (1939) RP1229.
- Stimson, H. F., Osborne, N. S., Sligh, Jr., T. S.: A flow calorimeter for specific heats of gases. S 20, 119 (1924-26) S503.
- Stimson, H. F., Osborne, N. S., Sligh Jr., T. S., Cragoe, C. S.: Specific heat of superheated ammonia vapor. S 20, 65 (1924-26) S501.

- Stockmann, L. L., Curtiss, L. F., Astin, A. V., Brown, B. W.:*
An improved radio meteorograph on the Olland principle. J 22, 97 (1939) RP1169.
- Cosmic-ray observations in the stratosphere with high-speed counters. J 23, 585 (1939) RP1254.
- Stokes, H. N., Cain, J. R.:*
On the colorimetric determination of iron with special reference to chemical reagents. B 3, 115 (1907) S53.
- On sulphocyanic acid. B 3, 157 (1907) S54.
- Stokes, H. N., Weber, H. C. P.:* The effects of heat on celluloid and similar materials. T 9, (1916-17) T98.
- Stoneburner, C. F., Taylor, L. S.:*
The measurement of low voltage X-ray intensities. J 9, 769 (1932) RP505.
- Operation of thick-walled X-ray tubes on rectified potentials. J 10, 233 (1933) RP527.
- Stoneburner, C. F., Taylor, L. S., Singer, G.:*
Effective applied voltage as an indicator of the radiation emitted by an X-ray tube. J 9, 561 (1932) RP491.
- A basis for the comparison of X-rays generated by voltages of different wave form. J 11, 293 (1933) RP592.
- Comparison of high voltage X-ray tubes. J 11, 341 (1933) RP595.
- Stovall, Jr., E. J., Davis, R.:* Dimensional changes in aerial photographic films and papers. J 19, 613 (1937) RP1051.
- Stowell, E. Z.:* Unidirectional radiobeacon for aircraft. J 1, 1011, (1928) RP35.
- Stowell, E. Z., Keiss, C. C.:* First spectrum of tantalum. J 12, 459 (1934) RP671.
- Strand, C. H.:* Cast iron for locomotive-cylinder parts. T 14, (1920-21) T172.
- Straus, S., Madorsky, S. L.:* Concentration of isotopes of chlorine by the counter-current electromigration method. J 33, 185 (1947) RP1767.
- Strauss, J., French, H. J.:* Lathe breakdown tests of some modern high-speed tool steels. T 17, 183 (1922-24) T228.
- Strausser, P. W. C., Blum, W.:* Outdoor exposure tests of electroplated nickel and chromium coatings on steel and nonferrous metals. J 24, 443 (1940) RP1293.
- Strausser, P. W. C., Blum, W., Brenner, A.:*
Protective value of nickel and chromium plating on steel. J 13, 331 (1934) RP712.
- Corrosion-protective value of electro-deposited zinc and cadmium coatings on steel. J 16, 185 (1936) RP867.
- Accelerated tests of nickel and chromium plating on steel. J 13, 519 (1934) RP724.
- Streiff, A. J., Glasgow, Jr., A. R., Rossini, F. D.:*
Determination of the purity of hydrocarbons by measurements of freezing points. J 35, 355 (1945) RP1676.
- Streiff, A. J., Mair, B. J.:*
Separation of the aromatic hydrocarbons, and the isolation of n-dodecane, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene, from the kerosene fraction of petroleum. J 24, 395 (1940) RP1289.
- Isolation of 1,2,3,4-tetramethylbenzene, 5,6,7,8-tetrahydronaphthalene, 1-methyl-5,6,7,8-tetrahydronaphthalene, and 2-methyl-5,6,7,8-tetrahydronaphthalene from petroleum. J 27, 343 (1941) RP1423.
- Streiff, A. J., Mair, B. J., Willingham, C. B.:*
Hydrogenation of the "extract" portion of the lubricant fraction from a midcontinent petroleum. J 21, 565 (1938) RP1144.
- Chemical constitution of the "extract" portion of the lubricant fraction from a midcontinent petroleum. J 21, 581 (1938) RP1145.
- Streiff, A. J., Murphy, E. T., Cahill, J. C., Flanagan, H. F., Sedlak, V. A., Willingham, C. B., Rossini, F. D.:* Purification, purity, and freezing points of 8 nonanes, 11 alkylcyclopentanes, 6 alkylcyclohexanes, and 4 butylbenzenes of the American Petroleum Institute-Standard and American Petroleum Institute-National Bureau of Standards series. J 38, 53 (1947) RP1760.
- Streiff, A. J., Murphy, E. T., Sedlak, V. A., Willingham, C. B., Rossini, F. D.:* Purification, purity, and freezing points of 7 heptanes, 16 octanes, 6 pentenes, cyclopentene, and 7 C₉H₁₂ alkylbenzenes of the American Petroleum Institute-Standard and American Petroleum Institute-National Bureau of Standards series. J 37, 331 (1946) RP1752.
- Streiff, A. J., Rossini, F. D.:* Method for determining individual hydrocarbons in mixtures of hydrocarbons by measurement of freezing points. J 32, 185 (1944) RP1584.
- Streiff, A. J., Willingham, C. B., Rossini, F. D., Glasgow, Jr., A. R.:* Analyses of alkylates and hydrocondimers. J 38, 537 (1947) RP1795.
- Strickenberg, L. R., Stang, A. H.:*
Results of some tests of manila rope. T 15, (1921) T193.
- Results of some compression tests of structural steel angles. T 16, 651 (1921-22) T218.
- Strieter, O. G.:*
Accelerated tests of asphalts. J 5, 247 (1930) RP197.
- A study of the weathering quality of roofing felts made from various fibers. J 16, 511 (1936) RP888.
- Weathering tests on filled coating asphalts. J 20, 159 (1938) RP1073.
- Method for determining the components of asphalts and crude oils. J 26, 415 (1941) RP1387.
- Strieter, O. G., Shaw, M. B., Bicking, G. W.:* Experimental production of roofing felts. J 2, 1001 (1929) RP67.
- Strieter, O. G., Snoko, H. R.:* A modified accelerated weathering test for asphalts and other materials. J 16, 481 (1936) RP886.
- Strock, M. S.:* An improved type of wave meter resonance indicator. S 20, 111 (1924-26) S502.
- Strother, D. H., Eaton, H. N.:* A super-heat meter or differential thermometer for airships. T 22, 171 (1927-28) T359.
- Stuart, D. M., Kirby, S. S., Berkner, L. V.:* Studies of the ionosphere and their application to radio transmission. J 12, 15 (1934) RP632.
- Stuart, D. M., Wright, R. B.:* Some experimental studies of the vibrations of quartz plates. J 7, 519 (1931) RP356.
- Stull, R. T.:* Wear of dies for extruding plastic clay. J 12, 501 (1934) RP675.
- Stull, R. T., Johnson, P. V.:*
Performance of a hollow-ware extrusion machine with different combinations of augers, spacers, and dies. J 14, 711 (1935) RP798.
- Relation between moisture content and flow-point pressure of plastic clay. J 22, 329 (1939) RP1186.
- Some properties of the pore system in bricks and their relation to frost action. J 25, 711 (1940) RP1349.
- Sturm, R. G., Osgood, W. R.:* The determination of stresses from strains on three intersecting gage lines and its application to actual tests. J 10, 685 (1933) RP559.
- Sucher, M., Branham, J. R.:* Displacement of nitrogen from and its solution in certain reagents during volumetric gas analysis. J 21, 63 (1938) RP1113.
- Sucher, M., Sager, T. P.:* Permeability of Neoprene to gases. J 22, 71 (1939) RP1166.
- Swanger, W. H.:*
The analysis of dental gold alloys. S 21, 209 (1926-27) S532.
- Melting, mechanical working, and some physical properties of rhodium. J 3, 1029 (1929) RP127.
- Swanger, W. H., Caldwell, F. R.:* Special refractories for use at high temperature. J 6, 1131 (1931) RP327.
- Swanger, W. H., France, R. D.:* Effect of zinc coatings on the endurance properties of steel. J 9, 9 (1932) RP454.
- Swanger, W. H., Jordan, L.:* (with collaboration of members of Bureau staff as indicated), The properties of pure nickel. J 5, 1291 (1930) RP257.
- Swanger, W. H., Maupin, A. R.:*
Structural changes in the bonding layer of soft-soldered joints in copper pipe lines on long-continued heating. J 28, 479 (1942) RP1465.
- Swanger, W. H., Maupin, A. R.:* Strength of soft-soldered joints in copper tubing. BMS58 (1940).
- Strength of sleeve joints in copper tubing made with various lead-base solders. BMS83 (1942).

- Swanger, W. H., Shelton, S. M.*, Fatigue properties of steel wire. J 14, 17 (1935) RP754.
- Sweeney, O. R., Emley, W. E.*, Manufacture of insulating board from cornstalks. M112 (1930).
- Sweeney, O. R., Wingfield, B., Naffziger, T. R., Whittemore, E. R., Overman, C. B., Acree, S. F.*, Production of pressboard from cornstalks. M123 (1936).
- Sweeney, O. R., Wingfield, B., Whittemore, E. R., Overman, C. B., Acree, S. F.*, Paper pulp from cereal straws by a modified sulfate process. M124 (1936).
- Sweeney, W. T., Hidnert, P.*:
Thermal expansion of tungsten. S 20, 483 (1924-26) S515.
Thermal expansion of beryllium and aluminum-beryllium alloys. S 22, 533 (1927-28) S565.
Thermal expansion of alloys of the "stainless iron" type. S 22, 639 (1927-28) S570.
Thermal expansion of graphite. T 21, 223 (1926-27) T335.
Thermal expansion of magnesium and some of its alloys. J 1, 771 (1923) RP29.
Thermal expansion of lead. J 9, 703 (1932) RP500.
- Sweetman, L. R., Fulweiler, W. H., Stang, A. H.*, Inspection and tensile tests of some worn wire ropes. J 17, 401 (1936) RP920.
- Sweetman, L. R., Greenspan, M.*, A transfer strain gage for large strains. J 34, 595 (1945) RP1658.
- Sweetman, L. R., Lyon, W. C., Whittemore, H. L., Stang, A. H.*, Strain measurement in the reinforcement for the dome of the Natural History Building. J 6, 183 (1931) RP268.
- Sweetman, L. R., Stang, A. H.*:
An extensometer comparator. J 15, 199 (1935) RP822.
Accelerated service tests of pintle bearings. J 15, 591 (1935) RP854.
Load distribution and strength of elevator cable equalizers. J 17, 291 (1936) RP912.
- Sweetman, L. R., Stang, A. H., Gough, C.*, The areas and tensile properties of deformed concrete-reinforcement bars. J 9, 509 (1932) RP486.
- Sweetman, L. R., Stang, A. H., Whittemore, H. L.*:
Tests of eight large H-shaped columns fabricated from carbon-manganese steel. J 16, 595 (1936) RP896.
Tests of steel chord members of the Bayonne Bridge. J 16, 627 (1936) RP897.
- Sweetman, L. R., Whittemore, H. L.*, Efficiency of machinists' vises. J 3, 191 (1929) RP91.
- Swenson, J. A., Flint, E. P.*, Distribution of compounds in portland cement. J 17, 261 (1936) RP910.
- Swenson, J. A., Insley, H., Flint, E. P., Newman, E. S.*, Relation of compositions and heats of solution of portland cement clinker. J 21, 355 (1938) RP1135.
- Swenson, J. A., Tucker, Jr., J., Walker, G. W.*, The physical properties of cast stone. J 7, 1067 (1931) RP389.
- Swenson, J. A., Wagner, L. A., Pigman, G. L.*, Effect of granulometric composition of cement on the properties of pastes, mortars, and concretes. J 14, 419 (1935) RP777.
- Sweo, B. J., Harrison, W. N.*, Some fusion properties of ground coat enamels as influenced by composition. J 10, 189 (1933) RP524.
- Sweo, B. J., Harrison, W. N., Shelton, S. M.*, Thermal-expansion characteristics of some ground-coat enamel frits. J 22, 127 (1939) RP1172.
- Sweo, B. J., Judd, D. B., Harrison, W. N., Hickson, E. F., Eickhoff, A. J., Shaw, M. B., Paffenbarger, G. C.*, Optical specification of light-scattering materials. J 19, 287 (1937) RP1026.
- Swietoslowski, W., Smith, E. R.*, Water as a reference standard for ebulliometry. J 20, 549 (1938) RP1088.
- Swindells, F. E., Jordan, L.*, The decarburization of ferrochromium by hydrogen. S 18, 327 (1922-23) S448.
- Swindells, F. E., Jordan, L.*, Gases in Metals: I. The determination of combined nitrogen in iron and steel and the change in form of nitrogen by heat treatment. S 18, 499 (1922-23) S457.
- T
- Taft, D. H., Schiefer, H. F.*:
Mechanical properties of cotton yarns. J 15, 237 (1935) RP826.
- Effect of yarn twist on the properties of cloth. J 16, 131 (1936) RP861.
- Taft, D. H., Schiefer, H. F., Porter, J. W.*, Effect of number of warp and filling yarns per inch and some other elements of construction on the properties of cloth. J 16, 139 (1936) RP862.
- Tail, A. C.*, Carbon brush terminals. M180 (1945).
- Tate, D. R., Wilson, B. L., Borkowski, G.*:
Dead-weight machines of 11,000- and 10,100-pound capacities. C446 (1943).
Proving rings for calibrating testing machines. C454 (1946).
Temperature coefficients for proving rings. J 37, 35 (1946) RP1726.
- Tate, J. T., Foote, P. D.*, Resonance and ionization potentials for electrons in cadmium vapor. B 14, 479 (1918-19) S317.
- Taylor, A. Hadley*:
The measurement of diffuse reflection factors, and a new absolute reflectometer. S 16, 421 (1920) S391.
A simple portable instrument for the absolute measurement of reflection and transmission factors. S 17, 1 (1922) S405.
- Taylor, A. Hadley, Crittenden, E. C.*, The pentane lamp as a working standard. B 10, 391 (1914) S216.
- Taylor, A. Hadley, McBride, R. S., Dunkley, W. A., Crittenden, E. C.*, The influence of quality of gas and other factors upon the efficiency of gas-mantle lamps. T 11, (1918-19) T110.
- Taylor, A. Hadley, Rosa, E. B.*, Theory, construction, and use of the photometric integrating sphere. S 18, 281 (1922-23) S447.
- Taylor, A. Hoyt*, Variation in direction of propagation of long electromagnetic waves. S 12, 269 (1915-16) S353.
- Taylor, A. S., Gilliland, T. R.*, Field equipment for ionosphere measurements. J 26, 377 (1941) RP1384.
- Taylor, C. S., Cragoe, C. S., Meyers, C. H.*, Vapor pressure of ammonia. S 16, 1 (1920) S369.
- Taylor, C. S., McKelvy, E. C.*, Composition, purification, and certain constants of ammonia. S 18, 655 (1922-23) S465.
- Taylor, H. S., Brickwedde, F. G., Scott, R. B.*, The difference in vapor pressures of ortho- and para-deuterium. J 15, 463 (1935) RP841.
- Taylor, J. K.*, A simple cyclic falling-film molecular still. J 37, 173 (1946) RP1739.
- Taylor, J. K., Brewer, A. K., Madorsky, S. L., Dibeler, V. H., Bradl, P., Parham, O. L., Britten, R. J., Reid, Jr., J. G.*, Concentration of isotopes of potassium by the counter-current electromigration method. J 38, 137 (1947) RP1765.
- Taylor, J. K., Buckley, F.*, Application of the Ilkovic equation to quantitative polarography. J 34, 97 (1945) RP1631.
- Taylor, J. K., Smith, E. R.*:
Reproducibility of the silver-silver chloride electrode. J 20, 837 (1938) RP1108.
Reproducibility of silver-silver halide electrodes. J 22, 307 (1939) RP1183.
Standard electrode potential of sodium. J 25, 731 (1940) RP1350.
- Taylor, J. K., Smith, E. R., Smith, R. E.*, Effect of reaction between mercury and oxygen upon polarographic waves of certain metals at small concentrations. J 37, 151 (1946) RP1736.
- Taylor, J. K., Tilton, L. W.*:
Refractive index and dispersion of normal and heavy water. J 13, 207 (1934) RP703.
Accurate representation of the refractivity and density of distilled water as a function of temperature. J 18, 205 (1937) RP971.
Refractive index and dispersion of distilled water for visible radiation, at temperatures 0° to 60° C. J 20, 419 (1938) RP1085.
- Taylor, J. S., Gries, J. M.*:
How to own your home: A handbook for prospective home owners. BH4 (1923).
How to own your home. BH17 (1931).
- Taylor, K., Wells, L. S.*:
Hydration of magnesia in dolomitic hydrated limes and putties. J 19, 215 (1937) RP1022.
Studies of heat of solution of calcium and magnesium oxides and hydroxides. J 21, 133 (1938) RP1121.
- Taylor, L. S.*:
The precise measurement of X-ray dosage. J 2, 771 (1929) RP56.

- Analysis of diaphragm system for the X-ray standard ionization chamber. J 3, 807 (1929) RP119.
- Absorption measurement of the X-ray general radiation. J 5, 517 (1930) RP212.
- Apparatus for the measurement of high constant or rippled voltages. J 5, 609 (1930) RP217.
- Accurate measurement of small electric charges by a null method. J 6, 807 (1931) RP306.
- Measurement of Lenard rays. J 7, 57 (1931) RP332.
- International comparison of X-ray standards. J 8, 9 (1932) RP397.
- Note on international comparison of X-ray standards. J 8, 325 (1932) RP417.
- Ionization of air by Lenard rays. J 17, 483 (1936) RP924.
- Time factors in the ionization of carbon disulphide by X-rays. J 17, 557 (1936) RP927.
- Taylor, L. S., Mohler, F. L.: Ionization of liquid carbon disulphide by X-rays. J 13, 659 (1934) RP733.
- A note on bactericidal effects of X-rays. J 13, 677 (1934) RP736.
- Taylor, L. S., Singer, G.: The calibration of the "fingerhut" ionization chamber. J 4, 631 (1930) RP169.
- An improved form of standard ionization chamber. J 5, 507 (1930) RP211.
- Further studies of the X-ray standard ionization chamber diaphragm system. J 6, 219 (1931) RP271.
- Air density corrections for X-ray ionization chambers. J 8, 385 (1932) RP424.
- Standard absorption curves for specifying the quality of x-radiation. J 12, 401 (1934) RP666.
- Note on the guarded-field X-ray ionization chamber. J 16, 165 (1936) RP865.
- Measurement, in roentgens, of the gamma radiation from radium by the free-air ionization chamber. J 24, 247 (1940) RP1283.
- Taylor, L. S., Singer, G., Charlton, A. L.: Measurement of supervoltage X-rays with the free-air ionization chamber. J 21, 19 (1938) RP1111.
- Concrete as a protective material against high-voltage X-rays. J 21, 783 (1938) RP1155.
- Taylor, L. S., Singer, G., Stoneburner, C. F.: Effective applied voltage as an indicator of the radiation emitted by an X-ray tube. J 9, 561 (1932) RP491.
- A basis for the comparison of X-rays generated by voltages of different wave form. J 11, 293 (1933) RP592.
- Comparison of high voltage X-ray tubes. J 11, 341 (1933) RP595.
- Taylor, L. S., Stoneburner, C. F.: The measurement of low voltage X-ray intensities. J 9, 769 (1932) RP505.
- Operation of thick-walled X-ray tubes on rectified potentials. J 10, 233 (1933) RP527.
- Taylor, L. S., Tucker, K. L.: The comparison of high voltage X-ray generators. J 9, 333 (1932) RP475.
- Taylor, R. H.: Factors affecting results obtained with the Mooney viscometer. C451 (1945).
- Taylor, R. H., Holt, W. L.: Small inertia-type machine for testing brake lining. J 24, 531 (1940) RP1297.
- Effect of roughness of cast-iron brake drums in wear tests of brake linings. J 27, 395 (1941) RP1427.
- Taylor, R. H., Logan, K. H.: Soil corrosion studies, 1932. Rates of loss of weight and pitting of ferrous and non-ferrous specimens and metallic protective coatings. J 12, 119 (1934) RP638.
- Taylor, R. H., Wheeler, H. G., Benedict, F.: Jar rings for use in home canning; their testing and a proposed specification. M181 (1945).
- Taylor, W. C.: Phase equilibria studies on mixtures of the compounds $4\text{CaO} \cdot \text{Al}_2\text{O}_3 \cdot \text{Fe}_2\text{O}_3 - 2\text{CaO} \cdot \text{Fe}_2\text{O}_3 - \text{K}_2\text{O} \cdot \text{Al}_2\text{O}_3$. J 21, 315 (1938) RP1131.
- The system $2\text{CaO} \cdot \text{SiO}_2 - \text{K}_2\text{O} \cdot \text{CaO} \cdot \text{SiO}_2$, and other phase-equilibrium studies involving potash. J 27, 311 (1941) RP1421.
- Further phase-equilibrium studies involving the potash compounds of portland cement. J 29, 437 (1942) RP1512.
- Nature of the prismatic dark interstitial material in portland cement clinker. J 30, 329 (1943) RP1536.
- Taylor, W. J., Method of Lagrangian curvilinear interpolation. J 35, 151 (1945) RP1667.
- Taylor, W. J., Pignocco, J. M., Rossini, F. D.: Method for calculating the properties of hydrocarbons and its application to the refractive indices, densities, and boiling points of the paraffin and monolefin hydrocarbons. J 34, 413 (1945) RP1651.
- Taylor, W. J., Pitzer, K. S.: Vibrational frequencies of semirigid molecules: A general method and values for ethylbenzene. J 38, 1 (1947) RP1758.
- Taylor, W. J., Rossini, F. D.: Theoretical analysis of certain time-temperature freezing and melting curves as applied to hydrocarbons. J 32, 197 (1944) RP1585.
- Taylor, W. J., Rossini, F. D., Pitzer, K. S., Kilpatrick, J. E., Ebert, J. P., Beckett, C. W., Williams, M. G., Werner, H. G.: Tables of selected values of hydrocarbons. C461 (1947).
- Taylor, W. J., Wagman, D. D., Kilpatrick, J. E., Pitzer, K. S., Rossini, F. D.: Heats, free energies, and equilibrium constants of some reactions involving O_2 , H_2 , H_2O , C , CO , CO_2 , and CH_4 . J 34, 143 (1945) RP1634.
- Taylor, W. J., Wagman, D. D., Williams, M. G., Pitzer, K. S., Rossini, F. D.: Heats, equilibrium constants, and free energies of formation of the alkylbenzenes. J 37, 95 (1946) RP1732.
- Taylor, W. J., Willingham, C. B., Pignocco, J. M., Rossini, F. D.: Vapor pressures and boiling points of some paraffin, alkylcyclopentane, alkylcyclohexane, and alkylbenzene hydrocarbons. J 35, 219 (1945) RP1670.
- Teale, R. P.: A physical photometer. J 27, 217 (1941) RP1415.
- Photometer for luminescent materials. J 34, 325 (1945) RP1646.
- Teale, R. P., Schuhmann, S.: A potentiometer for measuring voltages of 10 microvolts to an accuracy of 0.01 microvolt. J 22, 431 (1939) RP1195.
- Teale, Jr., R. P., Skogland, J. F.: Recent developments in lamp life-testing equipment and methods. T 20, 681, (1925-26) T325.
- Tector, P., Bleininger, A. V.: Viscosity of porcelain bodies. T 3, (1911-16) T30.
- Templin, R. L., Larson, L. J.: Load strain-gage test of 150-ton floating crane for the Bureau of Yards and Docks, U. S. Navy Department. T 13, (1919-20) T151.
- Tener, R. F., Holt, W. L.: Effect of antioxidants on the natural and the accelerated aging of rubber. J 14, 667 (1935) RP795.
- Tener, R. F., Kanagy, J. R., Charles, A. M., Abrams, E.: Effects of mildew on vegetable-tanned strap leather. J 36, 441 (1946) RP1713.
- Tener, R. F., Kingsbury, S. S., Holt, W. L.: Tensile properties of soft rubber compounds at temperatures ranging from -70° to $+147^\circ \text{C}$. T 22, 367 (1927-28) T364.
- Tener, R. F., Smith, W. H., Holt, W. L.: Aging of soft rubber goods. T 21, 353 (1926-27) T342.
- Termini, D. J., Willingham, C. B., Rossini, F. D., Mair, B. J.: Purification and sealing "in vacuum" of National Bureau of Standards Standard Samples of hydrocarbons. J 37, 229 (1946) RP1744.
- Theuer, A. U.: Effect of temperature on the stress-deformation of concrete. J 18, 195 (1937) RP970.
- Thibodeau, W. E., McPherson, A. T.: Photoelastic properties of soft, vulcanized rubber. J 13, 887 (1934) RP751.
- Thibodeau, W. E., Wood, L. A.: Photoelastic determination of stresses around a circular inclusion in rubber. J 20, 393 (1938) RP1083.
- Thomas, J. L.: A new design of precision resistance standard. J 5, 295 (1930) RP201.
- Some experiments with pure-metal resistance standards. J 12, 313 (1934) RP657.
- Reproducibility of the ice point. J 12, 323 (1934) RP658.
- Gold-chromium resistance alloys. J 13, 681 (1934) RP737.
- Gold-cobalt resistance alloys. J 14, 589 (1935) RP789.

- Electrical-resistance alloys of copper, manganese, and aluminum. *J* 16, 149 (1936) RP863.
- Stability of double-walled manganese resistors. *J* 36, 107 (1946) RP1692.
- Thomas, J. L., Wenner, F., A method of adjusting the temperature coefficient and resistance of low-valued resistance standards. *J* 12, 147 (1934) RP639.
- Thompson, G. N.:
American standard building code requirements for minimum design loads in buildings and other structures. M179 (1945).
Preparation and revision of building codes. BMS19 (1939).
Building code requirements for new dwelling constructions. BMS107 (1947).
- Thompson, J. G.:
Properties of lead-bismuth, lead-tin, type metal, and fusible alloys. *J* 5, 1085 (1930) RP248.
Effect of cold-rolling on the indentation hardness of copper. *J* 13, 745 (1934) RP742.
- Thompson, J. G., Acken, J. S., Determination of alumina and silica in steel by the hydrochloric acid residue method. *J* 9, 615 (1932) RP496.
- Thompson, J. G., Cleaves, H. E.:
A summary of information on the preparation and properties of pure iron. *J* 16, 105 (1936) RP860.
Preparation of iron oxide as a source of high-purity iron. *J* 18, 595 (1937) RP996.
Preparation of high-purity iron. *J* 23, 163 (1939) RP1226.
- Thompson, J. G., Hamilton, E. H., Nitrogen content of some standard-sample steels. *J* 9, 593 (1932) RP494.
- Thompson, J. G., Holm, V. C. F.:
Hydrogen-reduction method for the determination of oxygen in steel. *J* 21, 79 (1938) RP1114.
Determinations of oxygen in alloy steels. *J* 21, 87 (1938) RP1115.
Determinations of hydrogen in ferrous materials by vacuum extraction at 800° C and by vacuum fusion. *J* 26, 245 (1941) RP1373.
- Thompson, J. G., Mallett, M. W., Preparation of crucibles from special refractories by slip-casting. *J* 23, 319 (1939) RP1236.
- Thompson, J. G., Vacher, H. C., Bright, H. A., Cooperative study of methods for the determination of oxygen in steel. *J* 18, 259 (1937) RP976.
- Thompson, J. G., Vanick, J. S., de Sveshnikoff, W. W., Deterioration of steels in the synthesis of ammonia. *T* 22, 199 (1927-28) T361.
- Thompson, M. R.:
Purification and analysis of alkali cyanides. *J* 6, 1051 (1931) RP323.
A metal-connected glass electrode. *J* 9, 833 (1932) RP511.
Methods of measuring pH in alkaline cyanide plating baths. *J* 24, 423 (1940) RP1291.
- Tillyer, E. D., Shultz, H. I., Axial aberrations of lenses. *B* 14, 341 (1918-19) S311.
- Tilton, L. W.:
Prism refractometry and certain goniometrical requirements for precision. *J* 2, 909 (1929) RP64.
Prism size and orientation in minimum-deviation refractometry. *J* 6, 59 (1931) RP262.
Permissible curvature of prism surfaces and inaccuracy of collimation in precise minimum-deviation refractometry. *J* 11, 25 (1933) RP575.
Variations in refractive index of CO₂-free dry air and a statistical correlation with solar activity. *J* 13, 111 (1934) RP695.
Standard conditions for precise prism refractometry. *J* 14, 393 (1935) RP776.
Thermal control in minimum-deviation refractometry and temperature coefficients for a medium flint glass. *J* 17, 389 (1936) RP919.
Accurate representation of refractive index of distilled water as a function of wave length. *J* 17, 639 (1936) RP934.
Sources of error in precise refractometry. *J* 30, 311 (1943) RP1535.
Refractive-index standards of fluorocrown glass. *J* 34, 599 (1945) RP1659.
- Tilton, L. W., Finn, A. N., Tool, A. Q., Cause and removal of certain heterogeneities in glass. *S* 22, 719 (1927-28) S572.
- Tilton, L. W., Taylor, J. K.:
Refractive index and dispersion of normal and heavy water. *J* 13, 207 (1934) RP703.
Accurate representation of the refractivity and density of distilled water as a function of temperature. *J* 18, 205 (1937) RP971.
Refractive index and dispersion of distilled water for visible radiation, at temperatures 0° to 60° C. *J* 20, 419 (1938) RP1085.
- Tilton, L. W., Gurewitz, H. L., Measurement of the refractive index and dispersion of optical glass for control of product. *J* 32, 39 (1944) RP1572.
- Tilton, L. W., Saunders, J. B., Tool, A. Q., Changes caused in the refractivity and density of glass by annealing. *J* 38, 519 (1947) RP1793.
- Tilton, L. W., Tool, A. Q., Optical heterogeneity of a fused quartz disk. *J* 3, 619 (1929) RP112.
- Tobias, P. E., Kanagy, J. R., Accelerated aging of lace leathers. *J* 29, 51 (1942) RP1483.
- Tool, A. Q.:
Relaxation of stresses in annealing glass. *J* 34, 199 (1945) RP1637.
Viscosity and the extraordinary heat effects in glass. *J* 37, 73 (1946) RP1730.
- Tool, A. Q., Eichlin, C. G., Variations caused in heating curves of glass by heat treatment. *J* 6, 523 (1931) RP292.
- Tool, A. Q., Insley, H., Observations on crystalline silica in certain devitrified glasses. *J* 21, 743 (1938) RP1152.
- Tool, A. Q., Lloyd, D. B., Merritt, G. E., Dimensional changes caused in glass by heating cycles. *J* 5, 627 (1930) RP219.
- Tool, A. Q., Saunders, J. B.:
Effect of heat treatment on the expansivity of a pyrex glass. *J* 11, 799 (1933) RP626.
Expansion effects on the inversion of silica crystals in certain devitrified glasses. *J* 21, 773 (1938) RP1153.
- Tool, A. Q., Stair, R., The restoration of solarized ultra-violet transmitting glasses by heat treatment. *J* 7, 357 (1931) RP345.
- Tool, A. Q., Tilton, L. W., Optical heterogeneity of a fused quartz disk. *J* 3, 619 (1929) RP112.
- Tool, A. Q., Tilton, L. W., Finn, A. N., Cause and removal of certain heterogeneities in glass. *S* 22, 719 (1927-28) S572.
- Tool, A. Q., Valasek, J., Concerning the annealing and characteristics of glass. *S* 15, 537 (1919-20) S358.
- Tregoning, J. J., Kalousek, G. L., Jumper, C. H., Composition and physical properties of aqueous extracts from portland cement clinker pastes containing added materials. *J* 30, 215 (1943) RP1530.
- Tregoning, J. J., Milliken, K. A., Hockman, A., Sligh, W. H., Kessler, D. W., Plastic calking materials. BMS33 (1940).
- Tucker, F. H., Cain, J. R., The determination of phosphorus in steels containing vanadium. *T* 3, (1911-16) T24.
- Tucker, Jr., J., Blaine, R. L., Application of vibrators for measuring mortar consistency and fabricating mortar cubes. *J* 24, 103 (1940) RP1273.
- Tucker, Jr., J., Bragg, J. G., Tests of eighteen concrete columns reinforced with cast iron. *T* 12, (1919) T122.
- Tucker, Jr., J., Gause, G. R., Method for determining the moisture condition in hardened concrete. *J* 25, 403 (1940) RP1334.
- Tucker, Jr., J., Pigman, G. L., Pisapia, E. A., Rogers, J. S., Study of vibrated concrete. *J* 19, 575 (1937) RP1048.
- Tucker, Jr., J., Schuman, L.:
A portable apparatus for determining the relative wear resistance of concrete floors. *J* 23, 549 (1939) RP1252.
Tensile and other properties of concretes made with various types of cements. *J* 31, 107 (1943) RP1552.
- Tucker, Jr., J., Walker, G. W., Swenson, J. A., The physical properties of cast stone. *J* 7, 1067 (1931) RP389.
- Tucker, K. L., Taylor, L. S., The comparison of high voltage X-ray generators. *J* 9, 333 (1932) RP475.
- Tucker, W. A., French, H. J., Flow in a low-carbon steel at various temperatures. *T* 19, 619 (1924-25) T296.

- Tucker, W. A., Groesbeck, E. C., Accelerated laboratory corrosion test methods for zinc-coated steel. *J* 1, 255 (1928) RP10.
- Tucker, W. A., Kahlbaum, W., Dowdell, R. L., The tensile properties of alloy steels at elevated temperatures as determined by the "short-time" method. *J* 6, 199 (1931) RP270.
- Tucker, W. A., Rawdon, H. S., Effect of oxidizing conditions on accelerated electrolytic corrosion tests. *J* 3, 375 (1929) RP101.
- Tucker, W. A., Sinclair, S. E., Creep and structural stability of nickel-chromium-iron alloys at 1,600° F. *J* 10, 852 (1933) RP572.
- Tuckerman, L. B., Heterostatic loading and critical astatic loads. *J* 22, 1 (1939) RP1163.
- Tuckerman, L. B., Aitchison, C. S.:
An analysis of the deformation of the mooring spindle of the Shenandoah. *T* 18, 609 (1924-25) T270.
Design of specimens for short-time "fatigue" tests. *T* 19, 47 (1924-25) T275.
- Tuckerman, L. B., Aitchison, C. S., Ramberg, W., Whittemore, H. L., Tensile and compressive properties of some stainless steel sheets. *J* 28, 499 (1942) RP1467.
- Tuckerman, L. B., Dryden, H. L., A propeller-vibration indicator. *J* 12, 537 (1934) RP678.
- Tuckerman, L. B., Dryden, H. L., Brooks, H. B., A method of exciting resonant vibrations in mechanical systems. *J* 10, 659 (1933) RP556.
- Tuckerman, L. B., Keulegan, G. H., Eaton, H. N., A fabric tension meter for use on aircraft. *T* 20, 581 (1925-26) T320.
- Tuckerman, L. B., Stang, A. H., Tests of large columns with H-shaped sections. *T* 21, 1 (1926-27) T328.
- Tuckerman, L. B., Stang, A. H., Osgood, W. R., Test of a flat steel-plate floor under loads. *J* 12, 363 (1934) RP662.
- Tuckerman, L. B., Whittemore, H. L., Petrenko, S. N., A new dead-weight testing machine of 100,000 pounds capacity. *J* 4, 261 (1930) RP147.
- Tugman, O., Nutting, P. G., The intensities of some hydrogen, argon, and helium lines in relation to current and pressure. *B* 7, 49 (1911) S146.
- Tuma, E. C., Kluge, R. W., Lapped bar splices in concrete beams. *J* 35, 187 (1945) RP1669.
- Turcotte, A. L., McDonald, E. J.:
Study of Ofner's method for the determination of invert sugar. *J* 37, 429 (1946) RP1757.
Structures of difructose anhydride II. *J* 38, 423 (1947) RP1784.
- Tuttle, J. B., Determination of barium carbonate and barium sulphate in vulcanized rubber goods. *T* 7, (1916-17) T64.
- Tuttle, J. B., Isaacs, A., A study of some recent methods for the determination of total sulphur in rubber. *T* 5, (1914-15) T45.
- Tuttle, J. B., Smith, W. H.:
Iodine number of linseed and petroleum oils. *T* 4, (1913-14) T37.
Analysis of printing inks. *T* 4, (1913-14) T39.
- Tuttle, J. B., Waters, C. E.:
The determination of total sulphur in India rubber. *B* 6, 31 (1909-10) S174.
Some qualitative tests for gum arabic and its quantitative determination. *T* 7, (1916-17) T67.
- Tuttle, J. B., Yurov, L., Direct determination of India rubber by the nitrosite method. *T* 13, (1919-20) T145.
- Tyndall, E. P. T., Gibson, K. S., The visibility of radiant energy. *S* 19, 131 (1923-24) S475.
- Tyndall, E. P. T., Gibson, K. S., McNicholas, H. J., The ultra-violet and visible transmission of various colored glasses. *T* 13, (1919-20) T148.
- Tyndall, E. P. T., Gibson, K. S., McNicholas, H. J., Frehafer, M. K., Mathewson, W. E., The spectral transmissive properties of dyes: I. Seven permitted food dyes, in the visible, ultra-violet, and near infra-red. *S* 18, 121 (1922-23) S440.
- Tyndall, E. P. T., Karrer, E.:
Contrast sensibility of the eye. *S* 15, 679 (1919-20) S366.
Relative spectral transmission of the atmosphere. *S* 16, 377 (1920) S389.
- Tyndall, E. P. T., Priest, I. G., Meggers, W. F., Gibson, K. S., McNicholas, H. J., The color and spectral composition of certain high-intensity searchlight arcs. *T* 13, (1919-20) T168.
- Vacher, H. C.:
The system liquid iron-carbon oxides. *J* 11, 541 (1933) RP606.
Development of a fibrous texture in cold-worked rods of copper. *J* 22, 651 (1939) RP1210.
Development of texture in copper by cold-rolling. *J* 26, 385 (1941) RP1385.
X-ray measurement of the thickness of the cold-worked surface layer resulting from metallographic polishing. *J* 29, 177 (1942) RP1494.
- Vacher, H. C., Jordan, L., The determination of oxygen and nitrogen in irons and steels by the vacuum-fusion method. *J* 7, 375 (1931) RP346.
- Vacher, H. C., Thompson, J. G., Bright, H. A., Cooperative study of methods for the determination of oxygen in steel. *J* 18, 259 (1937) RP976.
- Valasek, J., Tool, A. Q., Concerning the annealing and characteristics of glass. *S* 15, 537 (1919-20) S358.
- Van Dusen, M. S.:
Note on the theory of heat conduction. *J* 4, 753 (1930) RP178.
Heat transfer through metal-inclosed insulation. *J* 5, 385 (1930) RP207.
- Van Dusen, M. S., Finck, J. L., Heat transfer through building walls. *J* 6, 493 (1931) RP291.
- Van Dusen, M. S., Meyers, C. H., The vapor pressure of liquid and solid carbon dioxide. *J* 10, 381 (1933) RP538.
- Van Dusen, M. S., Osborne, N. S.:
The specific heat of liquid ammonia. *B* 14, 397 (1918-19) S313.
The latent heat of pressure variation of liquid ammonia. *B* 14, 433 (1918-19) S314.
The latent heat of vaporization of ammonia. *B* 14, 439 (1918-19) S315.
- Van Dusen, M. S., Shelton, S. M., Apparatus for measuring thermal conductivity of metals up to 600° C. *J* 12, 429 (1934) RP668.
- Vanick, J. S., de Sveshnikoff, W. W., Thompson, J. G., Deterioration of steels in the synthesis of ammonia. *T* 22, 199 (1927-28) T361.
- Van Valkenburg, Jr., A., McMurdie, H. F., High-temperature X-ray diffraction apparatus. *J* 38, 415 (1947) RP1782.
- Veazey, B. H., Osborne, N. S., The testing of glass volumetric apparatus. *B* 4, 553 (1907-08) S92.
- Vinal, F. E., Craig, D. N., Vinal, G. W., Solubility of mercurous sulphate in sulphuric-acid solutions. *J* 17, 709 (1936) RP939.
- Vinal, G. W.:
Some electrical properties of silver sulphide. *B* 14, 331 (1918-19) S310.
International comparison of electrical standards. *J* 8, 729 (1932) RP448.
- Vinal, G. W., Altrup, F. W., Electromotive force of cells at low temperatures. *S* 17, 627 (1922) S434.
- Vinal, G. W., Bates, S. J., Comparison of the silver and iodine voltameters and the determination of the value of the Faraday. *B* 10, 425 (1914) S218.
- Vinal, G. W., Bovard, W. M., Inclusions in the silver voltameter deposits. *B* 13, 147 (1916-17) S271.
- Vinal, G. W., Brickwedde, L. H.:
Electromotive force of saturated Weston standard cells containing deuterium oxide. *J* 20, 599 (1933) RP1094.
Metastability of cadmium sulfate and its effect on electromotive force of saturated standard cells. *J* 26, 455 (1941) RP1389.
Relation of electromotive force to the concentration of deuterium oxide in saturated standard cells. *J* 27, 479 (1941) RP1435.
- Vinal, G. W., Craig, D. N.:
The viscosity of sulphuric-acid solutions used for battery electrolytes. *J* 10, 781 (1933) RP566.
Resistivity of sulphuric-acid solutions and its relation to viscosity and temperature. *J* 13, 689 (1934) RP738.
Chemical reactions in the lead storage battery. *J* 14, 449 (1935) RP778.
Solubility of lead sulfate in solutions of sulfuric acid, determined by dithione with a photonic cell. *J* 22, 55 (1939) RP1165.
- Thermodynamic properties of sulfuric-acid solutions and their relation to the electromotive force and heat of reaction of the lead storage battery. *J* 24, 475 (1940) RP1294.

- Vinal, G. W., Craig, D. N., Snyder, C. L.:*
Composition of grids for positive plates of storage batteries as a factor influencing the sulphation of negative plates. J 10, 795 (1933) RP567.
Note on the effects of cobalt and nickel in storage batteries. J 25, 417 (1940) RP1335.
- Vinal, G. W., Craig, D. N., Vinal, F. E.,* Solubility of mercurous sulphate in sulphuric-acid solutions. J 17, 709 (1936) RP939.
- Vinal, G. W., Howard, M. L.,* Effect of glass containers on the electromotive force of Weston normal cells. J 11, 255 (1933) RP588.
- Vinal, G. W., Hulett, G. A.,* Studies on the silver voltameter. B 11, 553 (1915) S240.
- Vinal, G. W., Ritchie, L. M.:*
Automatic apparatus for intermittent testing. T 14, (1920-21) T171.
A new method for determining the rate of sulphation of storage-battery plates. T 17, 117 (1922-24) T225.
- Vinal, G. W., Rosa, E. B.:*
The silver voltameter — Part I. First series of quantitative experiments. B 9, 151 (1913) S194.
Volume effect in the silver voltameter. B 13, 447 (1916-17) S283.
Summary of experiments on the silver voltameter at the Bureau of Standards and proposed specifications. B 13, 479 (1916-17) S285.
- Vinal, G. W., Rosa, E. B., McDaniel, A. S.:*
The silver voltameter — Part II. The chemistry of the filter-paper voltameter and the explanation of striations. B 9, 209 (1913) S195.
The silver voltameter — Part III. Second series of quantitative experiments and the preparation and testing of silver nitrate. B 9, 493 (1913) S201.
The silver voltameter — Part IV. Third series of quantitative experiments and special investigations. B 10, 475 (1914) S220.
- Vinal, G. W., Snyder, C. L.,* Oscillograph measurements of the instantaneous values of current and voltage in the battery circuit of automobiles. T 15, (1921) T186.
- Voigt, G. Q.,* Fire hazard of domestic heating installations. J 11, 353 (1933) RP596.
- Voigt, G. Q., Hahner, C., Finn, A. N.,* Gases in some optical and other glasses. J 19, 95 (1937) RP1014.
- W
- Wacker, P. F., Cheney, R. K., Scott, R. B.,* Heat capacities of gaseous oxygen, isobutane, and 1-butene from -30° to $+90^{\circ}$ C. J 33, 651 (1947) RP1804.
- Wadleigh, W. H.,* The viscosity of optical glass. J 11, 65 (1933) RP577.
- Wadleigh, W. H., Curtis, H. L., Sellman, A. H.,* A camera for studying projectiles in flight. T 18, 189 (1924-25) T255.
- Wagman, D. D., Kilpatrick, J. E., Pitzer, K. S., Rossini, F. D.,* Heats, equilibrium constants, and free energies of formation of the acetylene hydrocarbons through the pentyne, to $1,500^{\circ}$ K. J 35, 467 (1945) RP1682.
- Wagman, D. D., Kilpatrick, J. E., Taylor, W. J., Pitzer, K. S., Rossini, F. D.,* Heats, free energies, and equilibrium constants of some reactions involving O_2 , H_2 , H_2O , C , CO , CO_2 , and CH_4 . J 34, 143 (1945) RP1634.
- Wagman, D. D., Rossini, F. D.,* Note on the macroanalysis of carbon and hydrogen by combustion. J 32, 95 (1944) RP1577.
- Wagman, D. D., Williams, M. G., Pitzer, K. S., Rossini, F. D., Taylor, W. J.,* Heats, equilibrium constants, and free energies of formation of the alkylbenzenes. J 37, 95 (1946) RP1732.
- Wagner, L. A., Swenson, J. A., Pigman, G. L.,* Effect of granulometric composition of cement on the properties of pastes, mortars, and concretes. J 14, 419 (1935) RP777.
- Waidner, C. W., Burgess, G. K.:*
On the temperature of the arc. B 1, 109 (1903-05) S8.
Optical pyrometry. B 1, 189 (1903-05) S11.
Preliminary measurements on temperature and selective radiation of incandescent lamps. B 2, 319 (1906) S40.
Radiation from and melting points of palladium and platinum. B 3, 163 (1907) S55.
Platinum resistance thermometry at high temperatures. B 6, 149 (1909-10) S124.
- Note on the temperature scale between 100 and 500° C. B 7, 1 (1911) S143.
On the constancy of the sulphur boiling point. B 7, 127 (1911) S149.
- Waidner, C. W., Dickinson, H. C.,* On the standard scale of temperature in the interval 0° to 100° C. B 3, 663 (1907) S69.
- Waidner, C. W., Dickinson, H. C., Crowe, J. J.,* Observations on ocean temperatures in the vicinity of the icebergs and in other parts of the ocean. B 10, 267 (1914) S210.
- Waidner, C. W., Dickinson, H. C., Mueller, E. F., Harper 3d, D. R.,* A wheatstone bridge for resistance thermometry. B 11, 571 (1915) S241.
- Waidner, C. W., Fischer, L. A.,* The testing of clinical thermometers. B 1, 275 (1903-05) S13.
- Waidner, C. W., Mueller, E. F.,* Industrial gas calorimetry. T 4, (1913-14) T36.
- Walker, P. H., Hickson, E. F.,* Paint manual: With particular reference to Federal specifications. BMS105 (1946).
- Waldron, L. J.,* Metallic roofing for low-cost house construction. BMS49 (1940).
- Waldron, L. J., Snoke, H. R.:*
Survey of roofing materials in the Southeastern States. BMS6 (1938).
Survey of roofing materials in the Northeastern States. BMS29 (1939).
Roofing in the United States — Results of a questionnaire. BMS57 (1940).
Survey of roofing materials in the North Central States. BMS75 (1941).
- Waldron, L. J., Snoke, H. R.,* Survey of roofing materials in the South Central States. BMS84 (1942).
- Walker, G. K.,* Statistical investigation of the uniformity of grades of 1,000 Lovibond red glasses. J 12, 269 (1934) RP653.
- Walker, G. K., Priest, I. G., Judd, D. B., Gibson, K. S.,* Calibration of sixty-five 35-yellow Lovibond glasses. J 2, 793 (1929) RP58.
- Walker, G. W., Tucker, Jr., J., Swenson, J. A.,* The physical properties of cast stone. J 7, 1067 (1931) RP389.
- Walker, P. H.:*
The ring and ball method of test for softening point of bituminous materials, resins, and similar substances. J 4, 195 (1930) RP142.
Some technical methods of testing miscellaneous supplies, including paints and paint materials, inks, lubricating oils, soaps, etc. M15 (1916).
- Walker, P. H., Hickson, E. F.:*
Use of United States Government specification paints and paint materials. T 19, 27 (1924-25) T274.
Accelerated tests of organic protective coatings. J 1, 1 (1928) RP1.
Paint for priming surfaces. M137 (1932).
- Walker, P. H., Smither, F. W.,* Comparative tests of chemical glassware. T 10, (1917-18) T107.
- Walker, P. H., Steele, L. L.:*
Slushing oils. T 14, (1920-21) T176.
Shellac. T 17, 277 (1922-24) T232.
- Walkup, H. H., Groesbeck, E. C.,* Preece test (copper-sulphate dip) for zinc coatings. J 12, 785 (1934) RP688.
- Walkup, H. H., Lorentz, M. G.,* Zinc and its alloys. C395 (1931).
- Wallace, E. L.:*
The hydrolysis of chestnut and quebracho tanned leathers by sulphuric acid. J 7, 621 (1931) RP362.
Method for measuring the pH of leather using a simple glass-electrode assembly. J 15, 5 (1935) RP805.
- Wallace, E. L., Beek, Jr., J.,* A comparison of the quinhydrone and hydrogen electrodes in solutions containing tannin. J 4, 737 (1930) RP176.
- Wallace, E. L., Beek, Jr., J., Critchfield, C. L.,* Effect of sulphuric acid on chrome-tanned leather. J 14, 771 (1935) RP802.
- Wallace, E. L., Bowker, R. C.:*
Use of sulphite cellulose extract as a tanning material. T 21, 309 (1926-27) T339.
The influence of pH on the deterioration of vegetable-tanned leather by sulphuric acid. J 10, 559 (1933) RP547.
- Wallace, E. L., Bowker, R. C., Kanagy, J. R.,* Influence of magnesium sulphate on the deterioration of vegetable-tanned leather by sulphuric acid. J 14, 121 (1935) RP761.

- Wallace, E. L., Critchfield, C. L., Beek, Jr., J., Influence of sulphonated cod-liver oil on the deterioration of vegetable-tanned leathers by sulphuric acid. *J* 15, 73 (1935) RP811.
- Wallace, E. L., Kanagy, J. R.: Deterioration of vegetable-tanned leathers containing sulphuric acid and glucose. *J* 15, 523 (1935) RP846.
- Density of leather and its significance. *J* 31, 169 (1943) RP1556.
- Wallace, E. L., Kanagy, J. R., Critchfield, C. L., Influence of some sulphur-containing tanning materials on the deterioration of vegetable-tanned leathers by sulphuric acid. *J* 15, 369 (1935) RP835.
- Wallenberg, R. G., Burgess, G. K.: Melting points of the refractory elements. I. Elements of atomic weight from 48 to 59. *B* 10, 79 (1914) S205.
- The emissivity of metals and oxides. II. Measurements with the micro-pyrometer. *B* 11, 591 (1915) S242.
- Further experiments on the volatilization of platinum. *B* 13, 365 (1916-17) S280.
- Wallenberg, R. G., Burgess, G. K., Crowe, J. J., Rawdon, H. S., Observations on finishing temperatures and properties of rails. *T* 4, (1913-14) T38.
- Wallenberg, R. G., Coblenz, W. W., Preparation and reflective properties of some alloys of aluminum with magnesium and with zinc. *S* 15, 653 (1919-20) S363.
- Wallenberg, R. G., Merica, P. D., Malleability and metallography of nickel. *T* 19, 155 (1924-25) T281.
- Wallenberg, R. G., Merica, P. D., Finn, A. N., Mechanical properties and resistance to corrosion of rolled light alloys of aluminum and magnesium with copper, with nickel, and with manganese. *T* 12, (1919) T132.
- Wallenberg, R. G., Merica, P. D., Freeman, Jr., J. R., Constitution and metallography of aluminum and its light alloys with copper and with magnesium. *S* 15, 105 (1919-20) S337.
- Wallenberg, R. G., Merica, P. D., Scott, H., The heat treatment of duralumin. *S* 15, 271 (1919-20) S347.
- Walters, Jr., F. M., Wave length measurements in arc spectra photographed in the yellow, red, and infra-red. *S* 17, 161 (1922) S411.
- Walters, Jr., F. M., Davis, R.: Studies in color sensitive photographic plates and methods of sensitizing by bathing. *S* 17, 353 (1922) S422.
- Sensitometry of photographic emulsions and a survey of the characteristics of plates and films of American manufacture. *S* 18, 1 (1922-23) S439.
- Walters, Jr., F. M., Meggers, W. F., Absorption spectra of iron, cobalt, and nickel. *S* 22, 205 (1927-28) S551.
- Walton, W. W., Jessup, R. S., Roberts, D. E., Heats of combustion and solution of liquid styrene and solid polystyrene, and the heat of polymerization of styrene. *J* 38, 627 (1947) RP1801.
- Ward, G. W., Effect of heat treatment and cooling rate on the microscopic structure of portland cement clinker. *J* 26, 49 (1941) RP1358.
- Wardlaw, G. A., Standards and specifications for metals and metal products. *M*120 (1933).
- Washburn, E. W.: Determination of molecular weights in the vapor state from vapor pressure and evaporation data. *J* 2, 685 (1929) RP53.
- The principles of measurement and of calculation in their application to the determination of diophantine quantities. *J* 4, 221 (1930) RP145.
- On the determination of the empirical formula of a hydrocarbon. *J* 5, 867 (1930) RP236.
- A twin-bomb method for the accurate determination of pressure-volume-temperature data and a simple method for the accurate measurement of high pressures. *J* 9, 271 (1932) RP470.
- A calorimetric method for determining the intrinsic energy of a gas as a function of the pressure. *J* 9, 521 (1932) RP487.
- Standard states for bomb calorimetry. *J* 10, 525 (1933) RP546.
- Washburn, E. W., Bruun, J. H., Hicks, M. M., Apparatus and methods for the separation, identification, and determination of the chemical constituents of petroleum. *J* 2, 467 (1929) RP45.
- Washburn, E. W., Bunting, E. N., Note on phase equilibria in the system $\text{Na}_2\text{O}-\text{TiO}_2$. *J* 12, 239 (1934) RP648.
- Washburn, E. W., Smith, E. R.: Note on an electrical conductance method for determining liquefaction temperatures of solids. *J* 2, 787 (1929) RP57.
- Washburn, E. W., Smith, E. R., Frandsen, M., The isotopic fractionation of water. *J* 11, 453 (1933) RP601.
- An examination of water from various natural sources for variations in isotopic composition. *J* 12, 305 (1934) RP656.
- Washburn, E. W., Smith, E. R., Smith, F. A., Fractionation of the isotopes of hydrogen and of oxygen in a commercial electrolyzer. *J* 13, 599 (1934) RP729.
- Washburn, F. M., Constant-temperature still head for light-oil fractionation. *T* 12, (1919) T140.
- Washer, F. E.: Resolving power and distortion of typical airplane-camera lenses. *J* 22, 729 (1939) RP1216.
- Locating the principal point of precision airplane mapping cameras. *J* 27, 405 (1941) RP1428.
- Characteristics of wide-angle airplane-camera lenses. *J* 29, 233 (1942) RP1498.
- Region of usable imagery in airplane-camera lenses. *J* 34, 175 (1945) RP1636.
- Washer, F. E., Williams, H. B., Precision of telescope pointing for outdoor targets. *J* 36, 479 (1946) RP1717.
- Waters, C. E.: The action of sunlight and air upon some lubricating oils. *B* 7, 227 (1911) S153.
- The behavior of high-boiling mineral oils on heating in the air. *B* 7, 365 (1911) S160.
- The effect of added fatty and other oils upon the carbonization of mineral lubricating oils. *T* 1, (1910-12) T4.
- The evaporation test for mineral lubricating and transformer oils. *T* 2, (1912-14) T13.
- Data on the oxidation of automobile cylinder oils. *T* 7, (1916-17) T73.
- Comparative tests of porcelain laboratory ware. *T* 10, (1917-18) T105.
- Sulphur in petroleum oils. *T* 14, (1920-21) T177.
- Inks for recording instruments. *J* 17, 651 (1936) RP935.
- Quick-drying stamp-pad ink. *J* 20, 543 (1938) RP1087.
- The carbonization of lubricating oils. *C*99 (1920).
- Inks. *C*400 (1932).
- Inks. *C*413 (1936).
- Inks. *C*426 (1940).
- Typewriter ribbons and carbon paper. *C*431 (1941).
- Waters, C. E., Tuttle, J. B.: The determination of total sulphur in India rubber. *B* 8, 445 (1912) S174.
- Some qualitative tests for gum arabic and its quantitative determination. *T* 7, (1916-17) T67.
- Waters, C. E., Wolff, F. A.: Preliminary specifications for Clark and Weston standard cells. *B* 3, 623 (1907) S67.
- Clark and Weston standard cells. *B* 4, 1 (1907-08) S70.
- The electrode equilibrium of the standard cell. *B* 4, 81 (1907-08) S71.
- Watson, W. W., Meggers, W. F., Spectrum of lutecium monoxide. *J* 20, 125 (1938) RP1071.
- Watstein, D., Fishburn, C. C., Parsons, D. E., Water permeability of masonry walls. *B*MS7 (1938).
- Watstein, D., Parsons, D. E.: Compressive strength of structural tile masonry. *J* 18, 215 (1937) RP972.
- Width and spacing of tensile cracks in axially reinforced concrete cylinders. *J* 31, 1 (1943) RP1545.
- Watstein, D., Wells, L. S., Bishop, D. L., Differences in limes as reflected in certain properties of masonry mortars. *J* 17, 895 (1936) RP952.

- Weaver, E. R.:
Colorimetric determination of acetylene and its application to the determination of water. B 13, 27 (1916-17) S267.
Relation between the heating value of gas and its usefulness to the consumer. T 19, 347 (1924-25) T290.
Bibliography of scientific literature relating to helium. C81 (1st ed.), (1919).
Bibliography of scientific literature relating to helium. C81 (2d ed.), (1922).
Propane, butane, and related fuels. C420 (1938).
- Weaver, E. R., Eiseman, J. H., Shawn, G. B., A method for testing gas appliances to determine their safety from producing carbon monoxide. T 20, 125 (1925-26) T304.
- Weaver, E. R., Eiseman, J. H., Smith, F. A., A method for determining the most favorable design of gas burners. J 8, 699 (1932) RP446.
- Weaver, E. R., Ledig, P. G., Detector for water vapor in closed pipes. T 17, 637 (1922-24) T242.
- Weaver, E. R., McBride, R. S., Determination of sulphur in illuminating gas. T 3, (1911-16) T20.
- Weaver, E. R., Palmer, P. E., Thermal-conductivity method for the analysis of gases. T 18, 35 (1924-25) T249.
- Weaver, E. R., Shepherd, M., A burette for the accurate measurement of gas volumes without gas connection to a compensator. S 22, 375 (1927-28) S559.
- Weaver, E. R., Shepherd, M., Pickering, S. F., Preparation of oxygen of high purity. J 22, 301 (1939) RP1182.
- Weaver, E. R., Weibel, E. E., New forms of instruments for showing the presence and amount of combustible gas in the air. S 15, 47 (1919-20) S334.
- Weaver, F. C., Brooks, H. B., A variable self and mutual inductor. B 13, 569 (1916-17) S290.
- Weber, C. G.:
Properties of white Braille papers for Library of Congress publications. J 12, 811 (1934) RP690.
Relation of paper properties to register in offset lithography. J 13, 609 (1934) RP730.
- Weber, C. G., Carson, F. T., Snyder, L. W., Properties of fiber building boards. M132 (1931).
- Weber, C. G., Cobb, R. M., Register studies in offset lithography. J 9, 427 (1932) RP480.
- Weber, C. G., Geib, M. N. V.:
Treatment of offset papers for optimum register. J 16, 93 (1936) RP859.
New test for dimensional changes in offset papers. J 19, 665 (1937) RP1054.
- Weber, C. G., Hill, J. R.:
Care of filmstrips and motion-picture films in libraries. J 17, 753 (1936) RP942.
Stability of motion-picture films as determined by accelerated aging. J 17, 871 (1936) RP950.
Evaluation of motion-picture film for permanent records. M158 (1937).
- Weber, C. G., Jessup, D. A., Weissberg, S. G.:
Accelerated aging of fiber building boards. BMS4 (1938).
Stability of fiber building boards as determined by accelerated aging. BMS50 (1940).
Stability of fiber sheathing boards as determined by accelerated aging. BMS69 (1941).
- Weber, C. G., Reichel, R. C.:
Accumulation of moisture in walls of frame construction during winter exposure. BMS93 (1942).
Experimental dry-wall construction with fiber insulating board. BMS97 (1943).
- Weber, C. G., Scribner, B. W., Carson, F. T., Development of standards for flexible caselining materials. M182 (1946).
- Weber, C. G., Shaw, M. B., Experimental manufacture of paper for war maps. J 37, 325 (1946) RP1751.
- Weber, C. G., Shaw, M. B., Back, E. A., Effects of fumigants on paper. J 15, 271 (1935) RP828.
- Weber, C. G., Shaw, M. B., Geib, M. N., O'Leary, M. J., An experimental study of beater practice in the manufacture of offset papers. J 28, 241 (1942) RP1455.
- Weber, C. G., Shaw, M. B., O'Leary, M. J.:
Further experimental study of beater practice in the manufacture of offset papers. J 30, 267 (1943) RP1532.
- Weber, C. G., Shaw, M. B., O'Leary, M. J.:
Papermaking quality of cornstalks. M147 (1935).
Suitability of sweetpotato starch for the beater sizing of paper. M150 (1935).
- Weber, C. G., Snyder, L. W., Reactions of lithographic papers to variations in humidity and temperature. J 12, 53 (1934) RP633.
- Weber, C. G., Sookne, A. M., Stability of the viscose type of Ozaphane photographic film. J 21, 347 (1938) RP1134.
- Weber, C. G., Weissberg, S. G., Properties of some fiber building boards of current manufacture. BMS13 (1939).
- Weber, C. G., Weissberg, S. G., Jessup, D. A., Stability of sheathing papers as determined by accelerated aging. BMS35 (1939).
- Weber, C. G., Zimmerman, E. W., Kimberly, A. E., Relation of ink to the preservation of written records. J 14, 463 (1935) RP779.
- Weber, H. C. P.:
The preparation of chloroplatinic acid by electrolysis of platinum black. B 4, 365 (1907-08) S82.
On a modified form of stability test for smokeless powder and similar materials. B 9, 119 (1913) S192.
Atomic weight of bromine. B 9, 131 (1913) S193.
- Weber, H. C. P., Noyes, W. A., The atomic weight of chlorine. B 4, 345 (1907-08) S81.
- Weber, H. C. P., Stokes, H. N., The effects of heat on celluloid and similar materials. T 9, (1916-17) T98.
- Weibel, E., A study of electromagnet moving coil galvanometers for use in alternating-current measurements. B 14, 23 (1918-19) S297.
- Weibel, E. E., Weaver, E. R., New forms of instruments for showing the presence and amount of combustible gas in the air. S 15, 47 (1919-20) S334.
- Weibel, E., Wenner, F.:
The testing of potentiometers. B 11, 1 (1915) S223.
Adjustments of the Thomson bridge in the measurement of very low resistances. B 11, 69 (1915) S225.
- Weibel, E., Wenner, F., Silsbee, F. B., Methods of measuring the inductances of low-resistance standards. B 12, 11 (1915-16) S246.
- Weir, C. E., Compression of sole leather. J 35, 257 (1945) RP1672.
- Weiss, A., Huntoon, R. D., Synchronization of oscillators. J 38, 397 (1947) RP1780.
- Weiss, H. L., Hoback, W. G., Phelan, V. B., Structural properties of "Precision-Built, Jr." (second construction) prefabricated wood-frame wall construction sponsored by the Homasote Co. BMS89 (1942).
- Weissberg, S. G., Jessup, D. A., Bogaty, H., Properties and performance of fiber tile boards. BMS77 (1941).
- Weissberg, S. G., Jessup, D. A., Weber, C. G.:
Accelerated aging of fiber building boards. BMS4 (1938).
Stability of sheathing papers as determined by accelerated aging. BMS35 (1939).
Stability of fiber building boards as determined by accelerated aging. BMS50 (1940).
Stability of fiber sheathing boards as determined by accelerated aging. BMS69 (1941).
- Weissberg, S. G., Weber, C. G., Properties of some fiber building boards of current manufacture. BMS13 (1939).
- Weissler, P. G., and others, Mechanical properties of metals and alloys. C447 (1943).
- Wells, L. S., Reaction of water on calcium aluminates. J 1, 951 (1928) RP34.
- Wells, L. S., Clarke, W. F., McMurdie, H. F., Study of the system $\text{CaO-Al}_2\text{O}_3\text{-H}_2\text{O}$ at temperatures of 21° and 90°C . J 30, 367 (1943) RP1539.
- Wells, L. S., Bishop, D. L., Watstein, D., Differences in limes as reflected in certain properties of masonry mortars. J 17, 895 (1936) RP952.
- Wells, L. S., Flint, E. P.:
The activity coefficients of hydroxyl ion in solutions of calcium hydroxide at 30°C . J 11, 163 (1933) RP584.
Study of the system $\text{CaO-SiO}_2\text{-H}_2\text{O}$ at 30°C and of the reaction of water on the anhydrous calcium silicates. J 12, 751 (1934) RP687.

- The system lime-boric oxide-silica. *J* 17, 727 (1936) RP941.
- Relationship of the garnet-hydrogarnet series to the sulfate resistance of portland cements. *J* 27, 171 (1941) RP1411.
- Analogy of hydrated calcium silicoaluminates and hexacalcium aluminate to hydrated calcium sulfoaluminates. *J* 33, 471, (1944) RP1623.
- Wells, L. S., Flint, E. P., Clarke, W. F., Newman, E. S., Shartsis, L., Bishop, D. L., Extraction of alumina from clays and high-silica bauxites. *J* 36, 63 (1946) RP1691.
- Wells, L. S., Flint, E. P., McMurdie, H. F.: Formation of hydrated calcium silicates at elevated temperatures and pressures. *J* 21, 617 (1938) RP1147.
- Hydrothermal and X-ray studies of the garnet-hydrogarnet series and the relationship of the series to hydration products of portland cement. *J* 26, 13 (1941) RP1355.
- Wells, L. S., Newman, E. S.: Heats of hydration and transition of calcium sulfate. *J* 20, 825 (1938) RP1107.
- Effect of some added materials on dicalcium silicate. *J* 36, 137 (1946) RP1696.
- Wells, L. S., Smith, D. C., Suitability of fiber insulating lath as a plaster base. BMS3 (1933).
- Wells, L. S., Taylor, K.: Hydration of magnesia in dolomitic hydrated limes and putties. *J* 19, 215 (1937) RP1022.
- Studies of heat of solution of calcium and magnesium oxides and hydroxides. *J* 21, 133 (1938) RP1121.
- Wells, P. V., The turbidity standard of water analysis. *S* 15, 693 (1919-20) S367.
- Wenner, F.: A theoretical and experimental study of the vibration galvanometer. *B* 6, 347 (1909-10) S134.
- The four-terminal conductor and the Thomson bridge. *B* 8, 559 (1912) S181.
- A method of measuring earth resistivity. *B* 12, 469 (1915-16) S258.
- General design of critically damped galvanometers. *B* 13, 211 (1916-17) S273.
- A principle governing the distribution of current in systems of linear conductors. *S* 21, 191 (1926-27) S531.
- A new seismometer equipped for electromagnetic damping and electromagnetic and optical magnification (theory, general design, and preliminary results). *J* 2, 963 (1929) RP66.
- A method of reducing the effect of disturbances in the galvanometer branch of a potentiometer circuit. *J* 22, 425 (1939) RP1194.
- Methods, apparatus, and procedures for the comparison of precision standard resistors. *J* 25, 229 (1940) RP1323.
- Wenner, F., Cooter, I. L., Peterson, C., A vacuum-tube alternating-voltage compensator. *J* 25, 41 (1940) RP1312.
- Wenner, F., Mueller, E. F., The Waidner-Wolf and other adjustable electrical-resistance elements. *J* 15, 477 (1935) RP842.
- Wenner, F., Nusbaum, G. W., Cruickshanks, B. C., Note on the electrical resistance of contacts between nuts and bolts. *J* 5, 757 (1930) RP227.
- Wenner, F., Smith, A., Measurement of low resistance by means of the Wheatstone bridge. *S* 19, 297 (1923-24) S481.
- Wenner, F., Smith, E. H., Soule, F. M., Apparatus for the determination aboard ship of the salinity of sea water by the electrical conductivity method. *J* 5, 711 (1930) RP223.
- Wenner, F., Thomas, J. L., A method of adjusting the temperature coefficient and resistance of low-valued resistance standards. *J* 12, 147 (1934) RP639.
- Wenner, F., Weibel, E.: The testing of potentiometers. *B* 11, 1 (1915) S223.
- Adjustments of the Thomson bridge in the measurement of very low resistances. *B* 11, 65 (1915) S225.
- Wenner, F., Weibel, E., Silsbee, F. B., Methods of measuring the inductances of low-resistance standards. *B* 12, 11 (1915-16) S246.
- Wensel, H. T., International Temperature Scale and some related physical constants. *J* 22, 375 (1939) RP1189.
- Wensel, H. T., Henning, F., The freezing point of iridium. *J* 10, 809 (1933) RP568.
- Wensel, H. T., Judd, D. B., Roesser, W. F., Establishment of a scale of color temperature. *J* 12, 527 (1934) RP677.
- Wensel, H. T., Roesser, W. F.: The freezing point of nickel as a fixed point on the International Temperature Scale. *J* 5, 1309 (1930) RP258.
- Reference tables for platinum to platinum-rhodium thermocouples. *J* 10, 275 (1933) RP530.
- Freezing point of rhodium. *J* 12, 519 (1934) RP676.
- Methods of testing thermocouples and thermocouple materials. *J* 14, 247 (1935) RP768.
- Freezing temperatures of high-purity iron and some steels. *J* 26, 273 (1941) RP1375.
- Wensel, H. T., Roesser, W. F., Barbrow, L. E., Caldwell, F. R.: The Waidner-Burgess standard of light. *J* 6, 1103 (1931) RP325.
- Derivation of photometric standards for tungsten-filament lamps. *J* 13, 161 (1934) RP699.
- Wensel, H. T., Roesser, W. F., Caldwell, F. R., The freezing point of platinum. *J* 6, 1119 (1931) RP326.
- Werner, H. G., Rossini, F. D., Pitzer, K. S., Taylor, W. J., Kilpatrick, J. E., Ebert, J. P., Beckett, C. W., Williams, M. G., Tables of selected values of hydrocarbons. C461 (1947).
- Wesson, L. G., Combustion method for the direct determination of rubber. *T* 4, (1913-14) T85.
- West, M. J., Ramberg, W., Ballif, P. S., A method for determining stresses in a nonrotating propeller blade vibrating with a natural frequency. *J* 14, 189 (1935) RP764.
- Westhaver, J. W., Concentration of K³⁹ by counter-electromigration: Some theoretical aspects of operation. *J* 38, 169 (1947) RP1766.
- Wexler, A., Newman, S. B., Phelan, V. B., Structural properties of prefabricated plywood lightweight construction for walls, partitions, floors, and roofs sponsored by the Douglas Fir Plywood Association. BMS104 (1945).
- Wheeler, H. G., Newman, S. B., Impact strength of nylon and sisal ropes. *J* 35, 417 (1945) RP1679.
- Wheeler, H. G., Taylor, R. H., Benedict, F., Jar rings for use in home canning; their testing and a proposed specification. M181 (1945).
- Wheeler, J. A., Meggers, W. F., The band spectra of scandium-, yttrium-, and lanthanum monoxides. *J* 6, 239 (1931) RP273.
- Whistler, R. L., Martin, A. R., Conrad, C. M., Pectic substance of cotton fibers in relation to growth. *J* 25, 305 (1940) RP1326.
- Whistler, R. L., Martin, A. R., Harris, M.: Determination of uronic acids in cellulosic materials. *J* 24, 13 (1940) RP1268.
- Pectic substance in cotton and its relation to the properties of the fiber. *J* 24, 555 (1940) RP1299.
- Whistler, R. L., Martin, A. R., Smith, L., Harris, M., Estimation of aldehyde groups in hydrocellulose from cotton. *J* 27, 449 (1941) RP1432.
- White, J. D., Glasgow, Jr., A. R.: Separation of the three methylcyclohexanes from midcontinent petroleum. *J* 19, 423 (1937) RP1033.
- Separation of 1,2,4-trimethylcyclohexane and an isononane from a mid-continent petroleum. *J* 22, 137 (1939) RP1173.
- White, J. D., Leslie, R. T., Present status of the isolation and identification of the volatile hydrocarbons in a midcontinent petroleum. *J* 15, 211 (1935) RP824.
- White, J. D., Mair, B. J., Separation of petroleum hydrocarbons with silica gel. *J* 15, 51 (1935) RP809.
- White, J. D., Rose, Jr., F. W.: Isolation of normal nonane from a midcontinent petroleum. *J* 7, 907 (1931) RP383.
- Isolation of the three xylenes from an Oklahoma petroleum. *J* 9, 711 (1932) RP501.
- Isolation of ethylbenzene from an Oklahoma petroleum. *J* 10, 639 (1933) RP554.
- Isolation of a nonanaphthene from an Oklahoma petroleum. *J* 13, 799 (1934) RP745.
- Isolation of ethylcyclohexane from a midcontinent petroleum. *J* 15, 151 (1935) RP817.

- Isolation of an isononane from petroleum — Its fractionation from naphthenes by distillation with acetic acid. *J 17*, 943 (1936) RP955.
- Separation of isopropylbenzene from a mid-continent petroleum by adsorption with silica gel and distillation with acetic acid. *J 21*, 151 (1938) RP1122.
- Separation, by distillation with acetic acid, of the aromatic hydrocarbons from the fraction of a midcontinent petroleum boiling between 154° and 162° C. *J 21*, 167 (1938) RP1123.
- White, J. D., Rose, Jr., F. W., Calingaert, G., Soroos, H., 2,6-dimethylheptane: Its synthesis, properties, and comparison with an isononane from petroleum. *J 22*, 315 (1939) RP1184.
- Whitman, V. E., The neutralization of space charge by positive ions in caesium vapor. *J 4*, 157 (1930) RP138.
- Whitmore, L. M., Wormeley, P. L., Bowker, R. C., Hart, R. W., Churchill, J. B., Effects of glucose and salts on the wearing quality of sole leather. *T 12*, (1919) T138.
- Whitmore, E. R., Overman, C. B., Wingfield, B., Separation of cornstalks into long fibers, pith, and fines. M148 (1935).
- Whitmore, E. R., Wingfield, B., Naffziger, T. R., Overman, C. B., Sweeney, O. R., Acree, S. F., Production of pressboard from cornstalks. M123 (1936).
- Whitmore, E. R., Wingfield, B., Overman, C. B., Sweeney, O. R., Acree, S. F., Paper pulp from cereal straws by a modified sulfate process. M124 (1936).
- Whitmore, H. L., Equalizer apparatus for transverse tests of bricks. *T 18*, 107 (1924-25) T251.
- Whitmore, H. L., Adelson, J. S., Seaquist, E. O., Physical properties of electrically welded steel tubing. *J 4*, 475 (1930) RP161.
- Whitmore, H. L., Aitchison, C. S., Ramberg, W., Tuckerman, L. B., Tensile and compressive properties of some stainless steel sheets. *J 28*, 499 (1942) RP1467.
- Whitmore, H. L., Cotter, J. B., Stang, A. H., Phelan, V. B., Strength of houses: application of engineering principles to structural design. BMS109 (1947).
- Whitmore, H. L., Edwards, J. H., Stang, A. H.: Transverse tests of H-section column splices. *J 4*, 395 (1930) RP157.
- Compressive tests of bases for subway columns. *J 5*, 619 (1930) RP218.
- Strength of welded shelf-angle connections. *J 5*, 781 (1930) RP230.
- Stress distribution in welded steel pedestals. *J 5*, 803 (1930) RP232.
- Compressive tests of jointed H-section steel columns. *J 6*, 305 (1931) RP277.
- Whitmore, H. L., Frankland, J. M., Tests of cellular sheet-steel flooring. *J 9*, 131 (1932) RP463.
- Whitmore, H. L., Hathcock, B. D., Some compressive tests of hollow-tile walls. *T 17*, 513 (1922-24) T238.
- Whitmore, H. L., Lyon, W. C., Stang, A. H., Sweetman, L. R., Strain measurement in the reinforcement for the dome of the Natural History Building. *J 6*, 183 (1931) RP268.
- Whitmore, H. L., Nusbaum, G. W., Seaquist, E. O.: The relation of torque to tension for thread-locking devices. *J 7*, 945 (1931) RP386.
- Impact and static tensile properties of bolts. *J 14*, 139 (1935) RP763.
- Whitmore, H. L., Petrenko, S. N., Friction and carrying capacity of ball and roller bearings. *T 15*, (1921) T201.
- Whitmore, H. L., Phelan, V. B., Dill, R. S., Luxford, R. F., Structural and heat-transfer properties of "Multiple Box-Girder Plywood Panels" for walls, floors, and roofs sponsored by Loren H. Wittner. BMS99 (1943).
- Whitmore, H. L., Stang, A. H.: Tests of some girder hooks. *T 18*, 305 (1924-25) T260.
- Compressive strength of sand-lime brick walls. *T 19*, 57 (1924-25) T276.
- Tests of steel tower columns for the George Washington Bridge. *J 15*, 317 (1935) RP831.
- Methods of determining the structural properties of low-cost house constructions. BMS2 (1938).
- Whitmore, H. L., Stang, A. H., Fishburn, C. C.: Structural properties of one of the "Keystone beam steel floor" constructions sponsored by the H. H. Robertson Company. BMS10 (1938).
- Structural properties of a "Tilecrete" floor construction sponsored by Tilecrete Floors, Inc. BMS16 (1939).
- Structural properties of a reinforced-brick wall construction and a brick-tile cavity-wall construction sponsored by the Structural Clay Products Institute. BMS24 (1939).
- Structural properties of "Nelson Pre-Cast Concrete Foundation" wall construction sponsored by the Nelson Cement Stone Company, Inc. BMS26 (1939).
- Structural properties of a wall construction of "Knap Concrete Wall Units" sponsored by Knap America, Inc. BMS40 (1940).
- Whitmore, H. L., Stang, A. H., Heck, G. E., Structural properties of "Precision-Built" frame wall and partition constructions sponsored by the Homasote Co. BMS48 (1940).
- Whitmore, H. L., Stang, A. H., Hubbell, E., Dill, R. S., Structural, heat-transfer, and water-permeability properties of five earth-wall constructions. BMS78 (1941).
- Whitmore, H. L., Stang, A. H., Parsons, D. E.: Some tests of steel columns incased in concrete. *J 16*, 265 (1936) RP873.
- Structural properties of six masonry wall constructions. BMS5 (1938).
- Whitmore, H. L., Stang, A. H., Parsons, D. E., Structural properties of "Twachtman" constructions for walls and floors sponsored by Connecticut Pre-Cast Buildings Corporation. BMS20 (1939).
- Structural properties of a concrete-block cavity-wall construction sponsored by the National Concrete Masonry Association. BMS21 (1939).
- Structural properties of "Dun-Ti-Stone" wall construction sponsored by the W. E. Dunn Manufacturing Company. BMS22 (1939).
- Structural properties of a brick cavity-wall construction sponsored by the Brick Manufacturers Association of New York, Inc. BMS23 (1939).
- Structural properties of two brick-concrete-block wall constructions and a concrete-block wall construction sponsored by the National Concrete Masonry Association. BMS32 (1939).
- Structural properties of two "Dunstone" wall constructions sponsored by the W. E. Dunn Manufacturing Co. BMS38 (1940).
- Structural properties of a wall construction of "Pfeifer Units" sponsored by the Wisconsin Units Company. BMS39 (1940).
- Structural properties of "Tilecrete Type A" floor construction sponsored by the Tilecrete Co. BMS51 (1940).
- Structural properties of a masonry wall construction of "Munlock Dry Wall Brick" sponsored by the Munlock Engineering Co. BMS53 (1940).
- Structural properties of two nonreinforced monolithic concrete wall constructions. BMS61 (1940).
- Structural properties of a precast joist concrete floor construction sponsored by the Portland Cement Association. BMS62 (1940).
- Whitmore, H. L., Stang, A. H., Phelan, V. B.: Structural properties of the Insulated Steel Construction Company's "frameless-steel" constructions for walls, partitions, floors, and roofs. BMS9 (1938).
- Structural properties of the Curren Fabrihome Corporation's "Fabrihome" constructions for walls and partitions. BMS11 (1938).
- Structural properties of "Steelox" constructions for walls, partitions, floors, and roofs sponsored by Steel Buildings, Inc. BMS12 (1939).
- Structural properties of "Wheeling Long-Span Steel Floor" construction sponsored by the Wheeling Corrugating Company. BMS15 (1939).
- Structural properties of "Pre-Fab" constructions for walls, partitions, and floors sponsored by the Harnischfeger Corporation. BMS18 (1939).

- Structural properties of "Bender Steel Home" wall construction sponsored by The Bender Body Company. BMS27 (1939).
- Structural properties of "Scot-Bilt" prefabricated sheet steel constructions for walls, floors, and roofs sponsored by the Globe-Wernicke Co. BMS46 (1940).
- Structural properties of "Mu-Steel" prefabricated sheet-steel constructions for walls, partitions, floors, and roofs, sponsored by Herman A. Mugler. BMS67 (1941).
- Whittemore, H. L., Stang, A. H., Phelan, V. B., Dill, R. S., Structural and heat-transfer properties of "U. S. S. Panelbilt" prefabricated sheet-steel constructions for walls, partitions, and roofs sponsored by the Tennessee Coal, Iron & Railroad Co. BMS74 (1941).
- Whittemore, H. L., Stang, A. H., Sweetman, L. R.: Tests of eight large H-shaped columns fabricated from carbon-manganese steel. J 16, 595 (1936) RP896.
- Tests of steel chord members for the Bayonne Bridge. J 16, 627 (1936) RP897.
- Whittemore, H. L., Stang, A. H., Wilson, T. R. C.: Structural properties of a wood-frame wall construction sponsored by the Douglas Fir Plywood Association. BMS30 (1939).
- Structural properties of "Insulite" wall and "Insulite" partition constructions sponsored by The Insulite Company. BMS31 (1939).
- Structural properties of wood-frame wall, partition, floor, and roof constructions with "Red Stripe" lath sponsored by The Weston Paper and Manufacturing Co. BMS36 (1940).
- Structural properties of "Palisade Homes" constructions for walls, partitions, and floors, sponsored by Palisade Homes. BMS37 (1940).
- Structural properties of wood-frame wall and partition constructions with "Celotex" insulating boards sponsored by The Celotex Corporation. BMS42 (1940).
- Structural properties of prefabricated wood-frame constructions for walls, partitions, and floors sponsored by American Houses, Inc. BMS47 (1940).
- Whittemore, H. L., Sweetman, L. R., Efficiency of machinists' vises. J 3, 191 (1929) RP91.
- Whittemore, H. L., Tuckerman, L. B., Petrenko, S. N., A new dead-weight testing machine of 100,000 pounds capacity. J 4, 261 (1930) RP147.
- Whittemore, L. E., Dellinger, J. H., Kruse, S., A study of radio signal fading. S 19, 193 (1923-24) S476.
- Whittemore, L. E., Dellinger, J. H., Ould, R. S., Radio instruments and measurements. C74 (2nd ed.), (1924).
- Whitting, F. C., Bean, H. S., Benesh, M. E., Testing large-capacity rotary gas meters. J 37, 183 (1946) RP1741.
- Wichers, E., Finn, A. N., Clabaugh, W. S., Comparative tests of chemical glassware. J 26, 537 (1941) RP1394.
- Wichers, E., Schlecht, W. G., Gordon, C. L.: Attack of refractory platiniferous materials by acid mixtures at elevated temperatures. J 33, 363, (1944) RP1614.
- Preparing refractory oxides, silicates, and ceramic materials for analysis by heating with acids in sealed tubes at elevated temperatures. J 33, 451 (1944) RP1621.
- Use of sealed tubes for the preparation of acid solutions of samples for analysis, or for small scale refining: Pressures of acids heated above 100° C. J 33, 457 (1944) RP1622.
- Wichers, E., Schwab, F. W.: Preparation of benzoic acid of high purity. J 25, 747 (1940) RP1351.
- Purification of substances by slow fractional freezing. J 32, 253 (1944) RP1588.
- A physical method for determining residual water and other volatile materials in pure substances. J 33, 121 (1944) RP1600.
- Freezing temperature of benzoic acid as a fixed point in thermometry. J 34, 333 (1945) RP1647.
- Wick, R. M., The analysis of cyanide silver plating solutions. J 7, 913 (1931) RP384.
- Wiegerink, J. G.: Equipment for conditioning materials at constant humidities and at elevated temperatures. J 24, 639 (1940) RP1303.
- Moisture relations of textile fibers at elevated temperatures. J 24, 645 (1940) RP1304.
- Effects of drying conditions on properties of textile yarns. J 25, 435 (1940) RP1337.
- Wig, R. J., The effect of high-pressure steam on the crushing strength of Portland cement mortar and concrete. T 1, (1910-12) T5.
- Wig, R. J., Bates, P. H., Tests of the absorptive and permeable properties of Portland cement mortars and concretes, together with tests of damp-proofing and waterproofing compounds and materials. T 1, (1910-12) T3.
- Wig, R. J., Bates, P. H., Phillips, A. J., Action of the salts in alkali water and sea water on cements. T 2, (1912-14) T12.
- Wig, R. J., Davis, H. A., Value of the high-pressure steam test of Portland cement. T 5, (1914-15) T47.
- Wig, R. J., Pearson, J. C.: Variation in results of sieving with standard cement sieves. T 3, (1911-16) T29.
- Standardization of No. 200 cement sieves. T 4, (1913-14) T42.
- Wig, R. J., Pearson, J. C., Emley, W. E., Durability of stucco and plaster construction. T 7, (1916-17) T70.
- Wig, R. J., Williams, G. M., Finn, A. N., McCrory, S. H., Bebb, E. C., Ferguson, L. R., Durability of cement drain tile and concrete in alkali soils. T 9 (1916-17) T95.
- Wig, R. J., Williams, G. M., Gates, E. R., Strength and other properties of concretes as affected by materials and methods of preparation. T 6, (1915-16) T58.
- Wig, R. J., Williams, G. M., McCrory, S. H., Bebb, E. C., Ferguson, L. R., Investigation of the durability of cement drain tile in alkali soils. T 5, (1914-15) T44.
- Wilhelm, R. M.: Freezing point of mercury. B 13, 655 (1916-17) S294.
- Emergent-stem correction for thermometers in creosote-oil distillation flasks. T 5, (1914-15) T49.
- Wilhelm, R. M., Finkelstein, J. L., A standardized method for the determination of solidification points, especially of naphthalene and paraffin. S 15, 185 (1919-20) S340.
- Wilkie, J. B., Laundry "winter damage." J 6, 593 (1931) RP294.
- Williams, G. M., Durability of cement drain tile and concrete in alkali soils: Third progress report (1919-20). T 16, 463 (1921-22) T214.
- Williams, G. M., Furlong, I., Durability of cement drain tile and concrete in alkali soils; fourth progress report, 1923. T 20, 191 (1925-26) T307.
- Williams, G. M., Wig, R. J., Finn, A. N., McCrory, S. H., Bebb, E. C., Ferguson, L. R., Durability of cement drain tile and concrete in alkali soils. T 9, (1916-17) T95.
- Williams, G. M., Wig, R. J., Gates, E. R., Strength and other properties of concretes as affected by materials and methods of preparation. T 6, (1915-16) T58.
- Williams, G. M., Wig, R. J., McCrory, S. H., Bebb, E. C., Ferguson, L. R., Investigation of the durability of cement drain tile in alkali soils. T 5, (1914-15) T44.
- Williams, H. B., Washer, F. E., Precision of telescope pointing for outdoor targets. J 36, 479 (1946) RP1717.
- Williams, M. G., Pitzer, K. S., Rossini, F. D., Taylor, W. J., Wagman, D. D., Heats, equilibrium constants, and free energies of formation of the alkylbenzenes. J 37, 95 (1946) RP1732.
- Williams, M. G., Rossini, F. D., Pitzer, K. S., Taylor, W. J., Kilpatrick, J. E., Ebert, J. P., Beckett, C. W., Werner, H. G., Tables of selected values of hydrocarbons. C461 (1947).
- Williams, M. L., Elkinger, G. A., Bissell, A. G., The tee-bend test to compare the welding quality of steels. J 28, 1 (1942) RP1444.
- Willingham, C. B., Separation of hydrocarbons of high molecular weight by adsorption on silica gel. J 22, 321 (1939) RP1185.

- Willingham, C. B., Forziati, A. F., Glasgow, Jr., A. R., Rossini, F. D., Purification and properties of 29 paraffin, 4 alkylcyclopentane, 10 alkylcyclohexane, and 8 alkylbenzene hydrocarbons. *J 36*, 129 (1946) RP1695.
- Willingham, C. B., Forziati, A. F., Mair, B. J., Rossini, F. D., Hydrocarbons in the gasoline fraction of seven representative crudes, including all the distillate to 102° C and the aromatics to 160° C. *J 32*, 11 (1944) RP1571.
- Willingham, C. B., Mair, B. J.: Relationships between physical properties and chemical constitution of lubricating oil fractions. *J 17*, 923 (1936) RP954.
- Exhaustive fractionation of the "extract" portion of the lubricant fraction from a midcontinent petroleum. *J 21*, 535 (1938) RP1143.
- Efficiency of a rotary distillation column. *J 22*, 519 (1939) RP1201.
- Willingham, C. B., Mair, B. J., Streiff, A. J.: Hydrogenation of the "extract" portion of the lubricant fraction from a midcontinent petroleum. *J 21*, 565 (1938) RP1144.
- Chemical constitution of the "extract" portion of the lubricant fraction from a midcontinent petroleum. *J 21*, 581 (1938) RP1145.
- Willingham, C. B., Rossini, F. D.: Improved reflux regulator and head for laboratory distilling columns. *J 33*, 383 (1944) RP1615.
- Assembly, testing, and operation of laboratory distilling columns of high efficiency. *J 37*, 15 (1946) RP1724.
- Willingham, C. B., Rossini, F. D., Glasgow, Jr., A. R., Hydrocarbons in the 102° to 108° C fraction of petroleum. *J 38*, 621 (1947) RP1800.
- Willingham, C. B., Rossini, F. D., Glasgow, Jr., A. R., Murphy, E. T., Purification, purity, and freezing points of 31 hydrocarbons of the American Petroleum Institute-National Bureau of Standards Series. *J 37*, 141 (1946) RP1734.
- Willingham, C. B., Rossini, F. D., Glasgow, Jr., A. R., Streiff, A. J., Analyses of alkylates and hydrocodimers. *J 38*, 537 (1947) RP1795.
- Willingham, C. B., Rossini, F. D., Mair, B. J., Termini, D. J., Purification and sealing "in vacuum" of National Bureau of Standards Standard Samples of hydrocarbons. *J 37*, 229 (1946) RP1744.
- Willingham, C. B., Rossini, F. D., Streiff, A. J., Murphy, E. T., Cahill, J. C., Flanagan, H. F., Sedlak, V. A., Purification, purity, and freezing points of 8 nonanes, 11 alkylcyclopentanes, 6 alkylcyclohexanes, and 4 butylbenzenes of the American Petroleum Institute-Standard and American Petroleum Institute-National Bureau of Standards series. *J 38*, 53 (1947) RP1760.
- Willingham, C. B., Streiff, A. J., Murphy, E. T., Sedlak, V. A., Rossini, F. D., Purification, purity, and freezing points of 7 heptanes, 16 octanes, 6 pentenes, cyclopentene, and 7 C₈H₁₂ alkylbenzenes of the American Petroleum Institute-Standard and American Petroleum Institute-National Bureau of Standards series. *J 37*, 331 (1946) RP1752.
- Willingham, C. B., Taylor, W. J., Pignocco, J. M., Rossini, F. D., Vapor pressures and boiling points of some paraffin, alkylcyclopentane, alkylcyclohexane, and alkylbenzene hydrocarbons. *J 35*, 219 (1945) RP1670.
- Wilson, B., Johnson, C., Calibration of testing machines under dynamic loading. *J 19*, 41 (1937) RP1009.
- Wilson, B., Petrenko, S. N., Ramberg, W., Determination of the Brinell number of metals. *J 17*, 59 (1936) RP903.
- Wilson, B. L., Tate, D. R., Borkowski, G.: Dead-weight machines of 111,000 and 10,100-pound capacities. C446 (1943).
- Proving rings for calibrating testing machines. C454 (1946).
- Temperature coefficients for proving rings. *J 37*, 35 (1946) RP1726.
- Wilson, J. H., A new test for predicting the durability of varnishes (the photo-chemical embrittling test). *J 7*, 73 (1931) RP333.
- Wilson, J. H., Buzzard, R. W.: Deterioration of chromic acid baths used for anodic oxidation of aluminum alloys. *J 18*, 53 (1937) RP961.
- Anodic coating of magnesium alloys. *J 18*, 83 (1937) RP964.
- Wilson, J. H., Groesbeck, E. C., Tests of corrosion inhibitors for water treatment in air-conditioning equipment. *J 24*, 665 (1940) RP1305.
- Wilson, J. L., Eaton, H. N., Henrickson, H. B., Use and testing of sphgmomanometers. *T 21*, 729 (1926-27) T352.
- Wilson, R. E., Ingberg, S. H., Griffin, H. K., Robinson, W. C., Fire tests of building columns. *T 15*, (1921) T184.
- Wilson, T. R. C., Whittemore, H. L., Stang, A. H.: Structural properties of a wood-frame wall construction sponsored by the Douglas Fir Plywood Association. BMS30 (1939).
- Structural properties of "Insulite" wall and "Insulite" partition constructions sponsored by The Insulite Company. BMS31 (1939).
- Structural properties of wood-frame wall, partition, floor, and roof constructions with "Red Stripe" lath sponsored by The Weston Paper and Manufacturing Co. BMS36 (1940).
- Structural properties of "Palisade Homes" constructions for walls, partitions, and floors, sponsored by Palisade Homes. BMS37 (1940).
- Structural properties of wood-frame wall and partition constructions with "Celotex" insulating boards sponsored by The Celotex Corporation. BMS42 (1940).
- Structural properties of prefabricated wood-frame constructions for walls, partitions, and floors sponsored by American Houses, Inc. BMS47 (1940).
- Wilson, W. K., Launer, H. F.: Determination of pentosans in pulps and papers. *J 22*, 471 (1939) RP1199.
- Wilson, W. K., Launer, H. F., Photochemical stability of papers. *J 30*, 55 (1943) RP1517.
- Wilson, W. K., Scribner, B. W., Methods for the evaluation of analytical filter papers. *J 34*, 453 (1945) RP1653.
- Wing, H. J., Smith, W. H., Behavior of rubber hydrocarbon in a molecular still. *J 22*, 529 (1939) RP1202.
- Wing, H. J., Smith, W. H., Saylor, C. P., The preparation and crystallization of pure ether-soluble rubber hydrocarbon: Composition, melting point, and optical properties. *J 10*, 479 (1933) RP544.
- Wingfield, B., Acree, S. F.: Temperatures and hysteresis errors in calomel half-cells. *J 19*, 163 (1937) RP1018.
- Effects of hydrochloric acid and salts on the absorption of light by B-naphthoquinonesulfonic acid. *J 27*, 361 (1941) RP1424.
- Wingfield, B., Naffziger, T. R., Whittemore, E. R., Overman, C. B., Sweeney, O. R., Acree, S. F., Production of pressboard from cornstalks. M123 (1936).
- Wingfield, B., Whittemore, E. R., Overman, C. B., Separation of cornstalks into long fibers, pith, and fines. M148 (1935).
- Wingfield, B., Whittemore, E. R., Overman, C. B., Sweeney, O. R., Acree, S. F., Paper pulp from cereal straws by a modified sulfate process. M124 (1936).
- Winslow, C. P., Peck, M. F., Hoback, W. G., Phelan, V. B., Structural properties of "PHC" prefabricated wood-frame constructions for walls, floors, and roofs sponsored by the PHC Housing Corporation. BMS90 (1942).
- Wintermute, G. H., Kear, F. G., A simultaneous radiotelephone and visual range beacon for the airways. *J 7*, 261 (1931) RP341.
- Witting, F. C., Bean, H. S., Benesh, M. E., Joliet reference gas meter. *J 17*, 207 (1936) RP908.
- Wojciechowski, M.: Ebulliometric and tonometric measurements on normal aliphatic hydrocarbons. *J 17*, 453 (1936) RP921.
- Boiling point of ethyl ether and its relation to pressure. *J 17*, 459 (1936) RP922.
- Ebulliometric and tonometric study of normal aliphatic alcohols. *J 17*, 721 (1936) RP940.
- Measurements of certain physicochemical constants of benzene. *J 19*, 347 (1937) RP1029.
- Wojciechowski, M., Bekkedahl, N., Wood, L. A., Some physical properties of isoprene. *J 17*, 883 (1936) RP951.

- Wojciechowski, M., Smith, E. R.: Fractionation of the isotopes of oxygen in a commercial electrolyzer — a correction. J 15, 187 (1935) RP820.
- Boiling-point-composition diagram for dilute aqueous solutions of deuterium oxide. J 17, 841 (1936) RP947.
- Boiling-point-composition diagram of the system dioxane-water. J 18, 461 (1937) RP985.
- Boiling points and densities of acetates of normal aliphatic alcohols. J 18, 499 (1937) RP989.
- Wolesensky, E. L.: Investigation of synthetic tanning materials. T 20, 1 (1925-26) T302.
- Behavior of synthetic tanning materials toward hide substance. T 20, 275 (1925-26) T309.
- Analysis of synthetic tanning materials. T 20, 519 (1925-26) T316.
- Action of sodium sulphate in synthetic tanning materials. T 20, 529 (1925-26) T317.
- Evolution of hydrogen sulphide from vulcanized rubber. J 4, 501 (1930) RP162.
- Wolf, F. A.: The so-called international electrical units. B 1, 39 (1903-05) S3.
- The principles involved in the selection and definition of the fundamental electrical units to be proposed for international adoption. B 5, 243 (1908-09) S102.
- The temperature formula of the Weston standard cell. B 5, 309 (1908-09) S104.
- Wolf, F. A., Dellinger, J. H.: The electrical conductivity of commercial copper. B 7, 103 (1911) S148.
- Wolf, F. A., Shoemaker, M. P., Briggs, C. A.: Construction of primary mercurial resistance standards. B 12, 375 (1915-16) S256.
- Wolf, F. A., Waters, C. E.: Preliminary specifications for Clark and Weston standard cells. B 3, 623 (1907) S67.
- Clark and Weston standard cells. B 4, 1 (1907-08) S70.
- The electrode equilibrium of the standard cell. B 4, 81 (1907-08) S71.
- Wolthuis, E., Clark, G. L., Smith, W. H.: X-ray diffraction patterns of sol, gel, and total rubber when stretched and when crystallized by freezing and from solutions. J 19, 479 (1937) RP1039.
- Wood, L. A.: Synthetic rubbers: A review of their compositions, properties, and uses. C427 (1940).
- Rubber research and technology at the National Bureau of Standards. M185 (1947).
- Wood, L. A., Bekkedahl, N.: Entropy of isoprene from heat-capacity measurements. J 19, 551 (1937) RP1044.
- Crystallization of unvulcanized rubber at different temperatures. J 36, 489 (1946) RP1718.
- Wood, L. A., Bekkedahl, N., Gibson, R. E.: Effect of pressure on the melting of crystalline rubber. J 35, 375 (1945) RP1677.
- Wood, L. A., Bekkedahl, N., Peters, C. G.: Application of the interferometer to the measurement of dimensional changes in rubber. J 23, 571 (1939) RP1253.
- Wood, L. A., Bekkedahl, N., Roth, F. L.: Measurement of densities of synthetic rubbers. J 29, 391 (1942) RP1507.
- Wood, L. A., Bekkedahl, N., Wojciechowski, M.: Some physical properties of isoprene. J 17, 883 (1936) RP951.
- Wood, L. A., Thibodeau, W. E.: Photoelastic determination of stresses around a circular inclusion in rubber. J 20, 393 (1938) RP1083.
- Woodhull, L. R., Ives, H. E.: A tungsten comparison lamp in the photometry of carbon lamps. B 5, 555 (1908-09) S115.
- Woodward, M. B., Sigler, P. A.: Indentation and recovery of low-cost floor coverings. BMS14 (1939).
- Indentation characteristics of floor coverings. BMS73 (1941).
- Woodward, R. W., Burgess, G. K.: Conservation of tin in bearing metals, bronzes, and solders. T 11, (1918-19) T109.
- Manufacture and properties of steel plates containing zirconium and other elements. T 16, 123 (1921-22) T207.
- Thermal stresses in chilled iron car wheels. T 16, 193 (1921-22) T209.
- Woodward, R. W., Freeman, Jr., J. R.: Some properties of white metal bearing alloys at elevated temperatures. T 15, (1921) T188.
- Woodward, R. W., Merica, P. D.: Failure of brass. 1. Microstructure and initial stresses in wrought brasses of the type 60 per cent copper and 40 per cent zinc. T 8, (1916-17) T82.
- Behavior of wrought manganese bronze exposed to corrosion while under tensile stress. T 12, (1919) T135.
- Woolley, H. W.: Moisture condensation in building walls. BMS63 (1940).
- Wormeley, P. L., Bowker, R. C., Hart, R. W., Whitmore, L. M., Churchill, J. B.: Effects of glucose and salts on the wearing quality of sole leather. T 12, (1919) T138.
- Wormeley, P. L., Holt, W. L.: Power losses in automobile tires. T 16, 451 (1921-22) T213.
- Dynamometer tests of automobile tires. T 17, 559 (1922-24) T240.
- Effect of tire resistance on fuel consumption. T 19, 213 (1924-25) T283.
- Wearing qualities of tire treads as influenced by reclaimed rubber. T 19, 579 (1924-25) T294.
- Endurance tests of tires. T 20, 545 (1925-26) T318.
- Selection and care of garden hose. C327 (1927).
- Worner, R. K., Hamlin, C. H.: Properties of knit underwear fabrics of various constructions. J 13, 311 (1934) RP711.
- Worner, R. K., Mease, R. T.: Effect of purification treatments on cotton and rayon. J 21, 609 (1938) RP1146.
- Worthington, F. V., Carson, F. T.: A study of sheathing papers. J 3, 75 (1929) RP85.
- Critical study of the bursting strength test for paper. J 6, 339 (1931) RP278.
- Evaluating the wearing quality of currency paper. J 26, 467 (1941) RP1390.
- Measuring the degree of curl of paper. J 30, 113 (1943) RP1522.
- Apparatus for determining water-vapor permeability of moisture barriers. C453 (1946).
- Wright, C. A.: Experimental study of the scour of a sandy river bed by clear and by muddy water. J 17, 193 (1936) RP907.
- Wright, R. B., Hund, A.: New piezo oscillations with quartz cylinders cut along the optical axis. J 4, 383 (1930) RP156.
- Wright, R. B., Stuart, D. M.: Some experimental studies of the vibrations of quartz plates. J 7, 519 (1931) RP356.
- Wyckoff, H. O., Day, F. H., Singer, G.: Relative thickness of lead, concrete, and steel required for protection against narrow beams of X-rays. J 38, 665 (1947) RP1806.
- Wyckoff, H. O., Singer, G., Braestrup, C. B.: Absorption measurements for broad beams of 1- and 2-million-volt X-rays. J 37, 147 (1946) RP1735.
- Wymore, I. J.: Relation of radio wave propagation to disturbances in terrestrial magnetism. J 2, 1201 (1929) RP76.
- Wymore, I. J., Epstein, S., Cross, H. C., Groesbeck, E. C.: Observations on the iron-nitrogen system. J 3, 1005 (1929) RP126.

Y

- Yavorsky, P. J., Geller, R. F.: Melting point of alpha-alumina. J 34, 395 (1945) RP1649.
- Effects of some oxide additions on the thermal length changes of zirconia. J 35, 87 (1945) RP1662.
- Yavorsky, P. J., Geller, R. F., Steierman, B. L., Creamer, A. S.: Studies of binary and ternary combinations of magnesia, calcia, baria, beryllia, alumina, thorina, and zirconia in relation to their use as porcelains. J 36, 277 (1946) RP1703.
- Yeomans, C. D., Logan, K. H., Ewing, S. P.: Bureau of Standards soil-corrosion studies. I. Soils, materials, and results of early observations. T 22, 447 (1927-28) T368.
- Young, J. C., Faick, C. A., Hubbard, D., Finn, A. N.: Index of refraction, density, and thermal expansion of some soda-alumina-silica glasses as functions of the composition. J 14, 133 (1935) RP762.

Young, J. C., Finn, A. N., Effect of composition and other factors on the specific refraction and dispersion of glasses. J 25, 759 (1940) RP1352.

Young, J. C., Glaze, F. W., Faick, C. A., Finn, A. N., Density of some soda-potash-silica glasses as a function of the composition. J 22, 453 (1939) RP1197.

Young, J. C., Glaze, F. W., Finn, A. N., The density of some soda-lime-silica glasses as a function of the composition. J 9, 799 (1932) RP507.

Young, J. C., Schmid, B. C., Finn, A. N., Thermal expansions of some soda-lime-silica glasses as functions of the composition. J 12, 421 (1934) RP667.

Young, R. N., Effects of Cal as an accelerator of the hardening of Portland cement mixtures. T 14, (1920-21) T174.

Young, R. N., Bates, P. H., Rapp, P., Tests of

caustic magnesia made from magnesite from several sources. T 17, 529 (1922-24) T239.

Yurow, L., Tuttle, J. B., Direct determination of India rubber by the nitrosite method. T 13, (1919-20) T145.

Z

Zimmerman, E. W., Iron gallate inks — liquid and powder. J 15, 35 (1935) RP807.

Zimmerman, E. W., Weber, C. G., Kimberly, A. E., Relation of ink to the preservation of written records. J 14, 463 (1935) RP779.

Zippodt, R. P., Slater, W. A., Lord, A. R., Shear tests of reinforced concrete beams. T 20, 387 (1925-26) T314.

Zobel, C. G. F., Carroll, L. B., A hot-wire anemometer for measuring air flow through engine radiators. T 19, 287 (1924-25) T287.

SUBJECT INDEX, 1901 TO JUNE 30, 1947

- A
- Abbreviations, metric, M135
weights and measures, M121
- Aberration chromatic, of apochromatic microscope systems, RP316
equations in optical design, S550
spherical, of optical systems, RP466
spherical, of thin lenses, S461
spherical, representation, RP102
- Aberrations, axial, of lenses, S311
of lenses, measurement, RP52
of optical instruments, C27
of photographic objectives, S494
- Abrasion of steels, RP214
of teeth, RP1563
- Abrasive grain sizes, R118
machines, used in evaluating sole leather, RP1626
products, coated, R89
- Absolute determination of the ampere, RP1449
electrical units, RP1606
- Absorption coefficients, air for X-rays, RP271
coefficients, sound, RP149, RP242
dielectric, of antennas, S269
indices of metacresolsulfonphthalein, RP1569
losses of a photographic lens, compensation of aperture ratio markings, RP1803
of dyes by colloids in clays, T23
of sound by air, RP465
of X-rays by copper, RP212
optical, of minerals, S45, S168
optical, of quartz, S237
spectra, carotin and xanthophyll, RP337
spectra, iron, cobalt and nickel, S551
spectra, monoazo dyes, RP47
water, of brick, T111, T276, RP88, BMS60
water, of marble, T123
water, of portland cement mortars and concretes, T3
water, of tile, T120
- Absorptiveness of paper, RP959
- Accelerated aging test for paper, RP351
aging, of fiber sheathing board, BMS69.
laboratory corrosion test methods, RP10
tests of asphalt, RP197
- Acceleration pickup, RP1754
- Accelerometer, RP1754
- Accidents in the home, C397, C463.
- ac-dc transfer instrument, RP1344
- Acetanilide, determination of water, benzene, and ethanol in, RP1600
purification by fractional freezing, RP1588
- Acetate rayon blankets, properties, RP1589
- Acetates, alkali zinc uranyl, properties of, RP672
of normal aliphatic alcohols, RP989
- Acetic acid, dissociation constant, RP1537
- Acetyl derivatives of certain heptoses, of gulose, and lactulose, RP1663
- Acetylated glucosides, rotation, RP1601
- Acetylene, colorimetric determination, S267
flame, emissivity, S191
flame, spectrum, S156, S279, S362
hydrocarbons through the pentynes, thermodynamic properties, RP1682.
- Acid mixtures, pH curves, RP889
potassium phthalate, pH, RP1586, RP1690
potassium phthalate, behavior of hydrogen electrodes in, RP1598
- Acid-base titrations in nonpolar media, RP1794
- Acidic groups in cotton and wool, RP1314
- Acidimetric standard, benzoic acid, C25, S183
- Acidimetry, S178, S183, C25, C40
- Acidity and alkalinity, measurement, RP1632
- Acidity of oils, T223
of soils, RP539
standards, pH values, RP1495, RP1524, RP1559, RP1567, RP1580, RP1586
- Acid-resistant enamels, RP1315
- Acids, attack of platiniferous materials by, RP1614
attack of refractory materials, RP1621
combination with wool, RP1377, RP1452, RP1453, RP1486
effect of, on silk, RP385
- Acoustic materials, effect of paint on the sound absorption, RP1298
performance of motionpicture projectors, C439
quality, and phase of harmonics, S127
- Acoustical insulation, C403
properties of materials, measurement, RP700
- Acoustics, T333, C380, C396
of building materials, S526, S552, T337, RP48, RP149, C384
of buildings, S506, RP800, C396, C403, C418
- Activity coefficients of borate ion in boratesodium chloride solutions, RP1609
in concentrated solutions, RP1608
of dipolar indicators, RP1569
of hydrochloric acid in acid-salt mixtures of sulfonic acids, RP1567
salt effects on, RP1746
- Addition agents in copper electrotyping solutions, RP228
- Adhesive plaster, R85
- Adhesives for floor coverings, BMS34, BMS43, BMS59
for paper-coating, RP254
- Adsorbed films, thickness, RP241, RP264
- Adsorbents, chemical and physical properties, RP1479, RP1496
- Adsorption, analytical determination of aromatic hydrocarbons by, RP1582
hysteresis in gases, RP1674
of aromatic and monoolefin hydrocarbons with silica gel, RP1652
separation and recovery of aromatic hydrocarbons from paraffins and naphthenes by adsorption, RP1583
of sulfuric acid by leather, RP249
with silica gel, separation of hydrocarbons of high molecular weight by, RP1185
- Aeration of buffers, RP302
- Aerodynamic data on cylinders, RP221
- Aerodynamics, automobile models, RP591
automobile models, air forces and yawing moments, RP749
of tall buildings, RP637
- Aeronautic instruments, T237
- Affinity of anions for wool protein, RP1377
- Afterglow of cesium discharge, recombination of ions, RP1036
of mercury-arc discharge, recombination, RP1045
- Aggregate, mineral, production screens, wire diameters for, R147
- Aggregates, coarse (crushed stone, gravel and slag), R163
in concretes, tensile strength, RP1552
terrazzo, physical properties, BMS98
- Agricultural insecticides and fungicides (package sizes), R41
- Air analyzer for determining fineness of cement, T48
brake (electric railway) parts, packaging, R162
compressors for automotive service stations and garages, R202
compressors, tank-mounted, CS126
density and refractive index, RP695
flow measurement of, T183, RP49, RP1772
forces, measurements on automobile models, RP749
forces on circular cylinders with reference to dynamical similarity, S394
fuel mixtures, dew points, S500
hardening rivet steels, T358
infiltration, windows, BMS45
liquefier, S123
measurement of temperature distribution in, RP452
metering of large volumes of, RP335
permeability of fabrics, RP261
permeability instrument for fabrics, RP1471
permeability and speed of filter paper, RP1613
pump, reciprocating, rate of exhaustion, T224
raids, protection of radium during, H38
refractive index, S327
resistance measurements on vehicle models, RP748
speed indicators, T237

- Aircraft, blind landing by radio, RP238, RP602
compression members, RP698
corrosion of metals used in, RP1316
dopes, use of plastics, RP1098
engine radiators, T211
exhaust coatings, RP1773
fabric, fire-resistant, RP788
fabrics, RP758
finishes, resin, permeability to moisture, RP974
metals, effect of low temperatures on properties, RP1347
propeller vibration indicator, RP678
radio (see Radio)
signal lights, RP956
- Airplane antennas, characteristics, RP313
cabins, soundproofing of, RP63
camera lenses, characteristics of wide-angle, RP1498
camera lenses, resolving power and distortion, RP1216, RP1636
cameras, calibration, RP1428
cloth, grade A, specifications, C270
electric systems, optimum voltage, RP1247
mapping, camera errors, RP1177
mapping, optical requirements of, RP427
struts, T258
- Airport radio (see Radio)
- Airship ballast, T293
- Airships, mooring spindle, T270
superheat meter or differential thermometer, T359
- Airways, radio facilities (see Radio)
- Albumin, egg, catalyzed hydrolysis, RP1503
- Alcohol, as substitute motor fuel, RP1660, RP1673, RP1681
- Alcohol, ethyl, density and thermal expansion, S197
fuels, mixtures with gasoline, RP560, RP571
heat of combustion, RP405
specific gravity, C19
with gasoline, water tolerance, RP1059, RP1060
- Alcohols, heats of combustion and of formation of normal aliphatic, RP701
normal aliphatic, boiling points, RP940
normal aliphatic, boiling points and densities of acetates, RP989
thermal properties, RP312
- Alcohol-argon-type counter tubes, tests, RP1509
- Aldehyde groups, determination in cellulose and hydrocellulose, RP1432
- Aldonates of lead and calcium, optical rotations and other properties, RP770
- Aldonic acid, calcium salts of, RP328
polarographic studies, RP1448
properties and preparation, RP82, RP613
- Aldoses, bromine oxidation and mutarotation measurements, RP969
bromine oxidation of, RP418
reactions with chlorides, RP1408
- Algin, mannuronic lactone from, RP1727, RP1750
- Alginic acid, preparation, RP1750
- Aliphatic hydrocarbons, preparation and properties, RP1779
- Alkali cyanides, purification and analysis, RP373
degradation of wool protein, RP885
- Alkali-treated wool, nature of reaction, RP1516
- Alkalies, effect on silk, RP395
effect on wool, RP810
in portland cement, spectrographic determination, RP1633
in portland cement clinker, RP1570
- Alkaline soils, concrete durability in, T307
- Alkalis and alkaline earths, long-wave arc spectra, RP558
- Alkylates, analysis, RP1795
- Alkylbenzenes, heats of combustion and isomerization, RP1665
purification, purity, and freezing points, RP1752
- Alkylcyclohexanes, purification, purity, and freezing points, RP1760
- Alkylcyclopentanes, purification, purity, and freezing points, RP1760
- Alloy cast irons, elastic properties, RP1447, RP1459
steels at high temperatures, T205
steels, elastic properties, RP1459
steels containing rare elements, T207
steels, transformations, S335
- Alloys and metals, mechanical properties, C447
- Alloys, aluminum casting, heat treatment, T139
aluminum, copper, and magnesium, S337, T132, C76, C346
aluminum, magnesium, and zinc, S363
copper, thermal expansion, S410, RP1518, RP1550
copper-base and lead base, determination of tin in, RP1610
corrosion, RP1316
dental gold, analysis, RP1103
electrical resistance properties, RP863
fusable, RP248, C388
heat-resisting, properties, RP1106
high-purity iron-carbon, effect of rate of heating on austenitic grain size, RP1322
iron, production and properties, C409
iron-carbon, critical ranges, S484
iron-carbon, magnetic properties of, S463
iron-carbon, microstructural characteristics, RP1403
iron-carbon, and carbon steels, influence of initial structure and rate of heating on austenitic grain size, RP1481
iron-carbon, formation of austenite from aggregates of ferrite and cementite in, RP1489
nickel, C100
nickel-chromium-iron, tensile properties at elevated temperatures, RP474
nickel-copper, creep rates, RP1462
platinum, S483
pure iron and iron carbon, S266
pure iron with carbon and manganese, S453
soil corrosion, RP1602
white metal bearing, T188
zinc, physical and mechanical properties, C395
- Almond emulsin, action of phenyl glycosides, RP1369
- Alpha particles, fluctuations of emission, RP419
- Alpha-cellulose content of paper, RP295
particles, rate of emission, RP166
ray photographs, analysis of, RP171
- Alternating current detector, S22
distribution in cylindrical conductors, S509
galvanometer, S134, S297, S370
instruments, composite-coil type, RP411
plate supply, electron-tube generators, S381
power supply for amplifiers, S450
resistance and inductance of conductors, S374
resistance and inductance of solenoids, S472
resistance coils, S177
waves, Fourier analysis, S203
- Alternating stress tests, T275
- Altimeters, T237
- Altimeters and barometers, testing, C46
- Altitude, effect on knock rating in CFR engines, RP1475
- Alumina from clay, hydrochloric acid process for production, RP1756
determination in steel, RP496
extraction from clays and highsilica bauxites, RP1691
high, content, refractories, RP5
melting point, RP1564, RP1649
phase studies with relation to portland cement, RP1699
in the system $\text{CaO-Al}_2\text{O}_3\text{-H}_2\text{O}$, RP1539
systems and porcelains, RP1703
- Alumina-silica-lead oxide system, RP1564
- Aluminates, composition of aqueous solutions, RP34
- Aluminous silicates, analysis, RP180

- Alumin alloy, 24S, intercrystalline corrosion, RP1378
 alloy, effect of aging on some properties, RP1788
 alloys, corrosion, RP1328
 alloys with magnesium and zinc, S363
 and its alloys, properties, C76, T132, C346
 and its alloys, thermal expansion, S426, S497
 anodic oxidation, RP961, RP975
 atomic weight, RP957
 bronze, stress corrosion pitting, RP1366
 castings, tests, T139
 constitution and metallography, S337
 cooking utensils, cast (metal composition), CS134
 determination as oxide, S286
 determination by means of ammonium aurintricarboxylate, RP1117, RP1118
 determination in nitriding steels, RP533
 determination of gallium in, RP853
 effect of melting conditions on running quality, RP727
 effect on properties of cast red brass, RP1215
 oxide, heat capacity, RP1797
 oxide, phase equilibria with TiO_2 , RP619
 reflection, S45
 separation and determination, RP813
 separation by use of 8-hydroxyquinoline, RP86
 solders for, C78
 spectrum, S411, RP4
 ultraviolet reflection, RP141
 wires and cables, H10
- Aluminum-tube Geiger-Müller counters, RP1666
- Amalgam alloys, dental, analysis, RP1391
- Ambient atmosphere, its effect on the properties of cast red brass, RP1553
- American Dental Association, cooperative research, C433
 files and rasps pattern, R6
 gage design standards, M89, M100, CS8
 Houses, Inc., wood-frame construction, structural properties, BMS47
 national screw thread tables for shop use. I. Standard thread, M98
 national screw thread tables for shop use. II. Special threads, M99
 national standard screw threads, CS24
 national special screw threads, CS25
 Petroleum Institute-National Bureau of Standards hydrocarbons, properties, RP-1734, RP1752, RP1760
 standard building code requirements for masonry, M174
 standard building code requirements for minimum design loads in buildings and other structures, M179
- Amide and peptide bonds in proteins, catalyzed hydrolysis, RP1503
- Amino nitrogen contents of wool and collagen, RP787
 nitrogen, estimation in insoluble proteins, RP1038
- Ammeters, C20
 high-frequency, S206
 parallel wire, C74
 switchboard, S163
- Ammonia absorption refrigeration machines, T180
 chart of properties of, C142, M52, M57, M76
 composition, purification, and certain constants, S465
 deterioration of steels in the synthesis of, T361
 determination in illuminating gas, T34
 from beet sugar waste water, C145
 heat of vaporization, S315
 liquid, heat of pressure variation, S314
 liquid, specific heat, S313
 liquid, specific volume, S420
 specification, C373
 vapor pressure, S369
 vapor, saturated, specific heat, S315
 vapor, saturated, specific volume, S467
 vapor, superheated, specific volume, S501
- Ammonium aurintricarboxylate, preparation, RP-1118
 use in determination of aluminum, RP1117
 persulphate for etching iron and steel, S402
- Ammunition, testing by copper cylinders, T185
- Ampere, absolute determination, RP685, RP1200, RP1449, RP1606
 international, S171
- Amplifier, audio-frequency, C141, S450
 direct-current, RP641
 for feeble pulses, RP461
 resistance-coupled, for measuring ionization currents, RP550
 use in potential measurements, S504
 vacuum tube, RP1312
- Amplifiers, sensitive pulse, elimination of background "noise", RP522
- Amyl bromide, normal, synthesis and physical constants, RP482
- Amylases, action of starch, RP1599
- Analysis of gases (see Gas analysis)
- Analysis of a standard sample of the carburetted water-gas type by laboratories cooperating with the American Society for Testing Materials, RP1704
 of uranium spectrum, RP1729
- Anemometer, hot-wire, for measuring air flow, T287
- Anemometers, performance, RP1056
- Anemometry, hot-wire, RP850
- Aneroid barometers and altimeters, testing, C46
 calorimetry, S247, S248, S301, S313, S314, S315
 diaphragm capsule, RP1270
 sphygmomanometers, T352
- Anesthetic-gas cylinders, color marking, R176
- Angles, helix, of screw threads, M109
 structural steel, compressive strength, T218
- Anhydrofructose and difructose anhydride, RP224
- Animal tissue, transmissive properties, T369
- Anions, affinity for wool protein, RP1377
 of strong acids, affinity, for wool, RP1452, RP1453
- Annealing of glass, changes in refractivity and density, RP1793
 optical glass, effect of temperature gradients in, S572
 relaxation of stresses, RP1637
- Annual Report, see Reports, annual
- Anodic oxidation of aluminum alloys, RP961, RP975
 treatment of magnesium alloys, RP964
- Antenna, broadcast, radio field-intensity records, RP874
 radio, in pit for blind landing of aircraft, RP1006
 system for elimination of night effects in radio range-beacon reception, RP513
- Antennas, Adcock, RP581
 airplane, S341, S480, RP313
 coil, S354, S428, S431, S536
 directional, graphical determination of polar patterns, RP435
 effect of distributed reactance, S126, C74
 effective height, S159, S226, C74
 installation rules, H9, H35
 natural wave length, S326
 oscillations, S157, S326
 resistance, S189, S257, S269, S341, C74
- Anthracte burners, underfeed type, CS48
 cokes, heats of combustion, RP1139
- Antimony, distillation and determination, RP1116
 effect on bearing bronzes, RP442
 effect on certain properties of cast red brass, RP1215
 photoelectrical properties of sulphide of, S322, S398, S462
 reflecting power, S152
 separation by distillation as chloride, RP871
 spectrographic determination in tin, RP1451
 spectrum, S411, S490
 spectrum and ionization potential, RP1464
 thermal expansion and density, RP784
 lead alloys, thermal expansion, RP938
- Antioxidants, effect in rubber, RP795
 for preventing sulphur dioxide deterioration of cotton, RP294
- Antiscatter treatment for glass, M175
- A. P. I. scale for petroleum oil hydrometers, C154, C410
- Aperture ratio markings of a photographic lens, compensation for absorption, reflection, and vignetting losses, RP1803
- Apparatus for determining water-vapor permeability of moisture barriers, C453
- Apparel, safety wearing; materials for, CS129

Apple wraps, CS44
 Appliances, safety, for elevators, maintenance, C442
 Application of coatings, BMS105
 Aprons, surgeons' rubber, specification, C247
 Aqua regia, pressures developed by, on heating, RP1622
 Aqueous solutions, heat capacities in some, RP151
 Aqueous solutions of acid potassium phthalate, stability, RP852
 Arabinose, by-product from hydrolyzate of beet pulp, RP1616
 Arabinose, thermal mutarotation, RP892
 Arc, cadmium vapor, S371
 electric, color temperature, S443
 electric, oscillations from, S60
 fused steel, T179
 high-frequency, S60, S226, C74
 low-voltage, in caesium vapor, S386
 mercury, S128
 searchlight, high-intensity, T168
 spectrum of uranium, RP1729
 temperature, S8
 Architectural acoustics, S506, C300, C380, C396, C403, C418
 Area, cross-sectional, determination, RP1258
 measurements, C2
 measurement of leather, T153
 Argentite, photo-electric sensitivity, S398, S446
 Argon, infrared spectrum, RP540, RP781
 and krypton, infrared emission spectra, RP-1790
 interference measurements, RP710
 lines, intensity, S146
 spectrum, S414, RP540, RP781, RP1061
 Arlington Memorial Bridge tests, RP609
 Army duck, specification, C166
 Aromatic hydrocarbons, analytical determination by adsorption, RP1582
 determination and separation from paraffins, naphthenes, and monoolefins by adsorption, RP1652
 heats of combustion and isomerization, RP1665
 heats, equilibrium constants, and free energies of formation, RP1732
 purification, purity, and freezing points, RP1752, RP1760
 separation and recovery from paraffins and naphthenes by adsorption, RP1583
 vapor pressures and boiling points, RP1670
 Arsenic, colorimetric determination in ferrous and nonferrous alloys, RP1267
 distillation and determination, RP1116
 separation by distillation as chloride, RP871
 spectrographic determination in tin, RP1451
 spectrum, S490, RP116
 Arsenious oxide, use in standardizing solutions of potassium permanganate, RP1057
 Art materials for school use, crayons, chalks, and related (Types, sizes, packaging, and colors), R192
 education in schools, color materials, CS130
 Artichoke cossette dimensions, RP931
 Jerusalem, levulose from, S519
 Artists' oil paints, CS98
 Artificial daylight, M114
 Artificial stone, packaging, R117
 Asbestos metallic cloth gaskets, specifications, C242
 millboard and paper, R19
 packing specifications, C238, C241, C243, C334
 paper and asbestos millboard, R19
 Asbestos-cement pipe, behavior in soils, RP1602
 preparation from beet pulp, RP1594
 Ascorbic acid in blood and urine, RP1364
 Ash handles, R76
 Ash in textile fibers, electroanalytic estimation of, RP1314
 Asphalt, R4
 accelerated weathering tests, RP197, RP886
 method for determining components, RP1387
 primer, specification, C162
 roll roofing, and asphalt- and tar-saturated-felt products, R213
 roofing and shingles, specification, C285
 shingles, weathering, RP1002
 specific heat, M97
 thermal expansion, M97
 specifications, C159, C160, C168, C192
 tile, R225
 varnish, specification, C104

Asphalt-prepared roll roofings and shingles, BMS70
 Asphalt-saturated fabric for waterproofing, specification, C287
 rag felt for flashings, specification, C286
 Asphalted paper, T312
 Asphalts, weathering tests, RP1073
 Asphyxiation from manufactured gas, T303
 Assays, biological, optimum use of material, RP263
 Atmosphere chart, M78, M82
 relative spectral transmission, S389
 Atmospherics, relation to radio reception, S476
 Atomic dimensions and melting points, RP915
 dimensions and optical rotation, RP358, RP978
 dimension and optical rotation of amyl alcohols, RP1551
 linkages, energies of, in paraffin hydrocarbons, RP701
 numbers, symbols, weights, M126, M183
 theory, S386
 Atomic weight, aluminum, RP957
 bromine, S193
 chlorine, S81
 gallium, RP838
 hydrogen, S77
 osmium, RP471
 oxygen in air and in water, RP932
 Atomization of liquids, mechanism, RP281
 Atterberg plasticity method, T46
 Audio currents, generator, S569
 Audio-frequency amplification, S450, C141
 generator, an improved, RP367
 generator in radio station work, RP220
 measurement, RP195
 piezo-electric generator, RP40
 Auditoriums, C300, C380, C384
 Augers for clay-working machines, RP36
 Austenite, formation from aggregates of ferrite and cementite in iron-carbon alloy, RP1489
 transformation on quenching iron-carbon alloys, RP1225
 Austenitic grain size as affected by heating rate, RP1322
 influence on the critical cooling rate of high-purity, iron-carbon alloys, RP1308
 of carbon steels and iron-carbon alloy, influence of initial structure and rate of heating, RP1481
 of iron-carbon alloys and carbon steels, RP1092
 Automatic regulating valves, R219
 weather observations, RP1318
 Automobile brake lining, R66
 and truck tires, treading, CS108
 headlights, C276
 air forces and yawing moments, RP749
 Automotive service stations and garages, air compressors for, R202
 engines, effect of fuel distribution on performance, RP1712
 Aviation fuel components, analysis, RP1795
 signal light colors, RP1565
 Axes, forged, R158
 Axial rigidity, RP1737
 of perforated tension members, RP1568
 Axles, railway, foreign specifications, T61
 Azeotropic distillation, RP1724
 separation of hydrocarbons, RP1402
 with methyl alcohol, separation of naphthenes from paraffins, RP1296

B

Babbitt metals, T188
 Backflow from plumbing fixtures, BMS28
 Bactericidal agent, use of silver, RP836
 effect of chlorites on sugars, RP1436
 Bags, glassine, R107
 ice, rubber, specifications, C227, C228
 paper, for cement and lime, T187
 paper, grocers', R42
 paper, notion and millinery, R129
 poltizer, rubber, specification, C222
 Baker's yeast, action on *d*-talose, RP1191
 Balance, magnetic, for the inspection of austenitic steel, RP532
 wheels for watches, RP670
 Ball, coefficient of restitution and spin, measurement, RP1624
 bearings, friction and carrying capacity, T201
 clays, T227
 packings for rectifying columns, RP1049

- Ballast for airships, T293
 Ballistics, spark photography in, S508
 Balloon fabrics, permeability, T113
 Balloons, effect of solar radiation, T128
 unmanned, radio transmission of ultraviolet
 intensity measurements from, RP1181, RP1207
 Band saws, metal cutting; hard edge, flexible back, R214
 Bandages, rubber, specification, C219
 Bands, rubber, specification, C284
 Bank checks, notes, drafts, and similar instruments, R50
 Baria systems and porcelains, RP1703
 Barium benzoate, as a buffer in oxidation of aldoses by bromine water, RP82
 carbonate in rubber goods, T64
 carbonate titration method for determining carbon in steel, T33
 fuconate, preparation of, S459
 photo-electric cells, S462
 spectrum, S312, RP4
 sulphate in rubber goods, T64
 Barium-strontium titanate dielectrics, properties, RP1776
 Barkometer correction tables, C449
 Barograph diaphragm capsule, RP1270
 Barographs, T237
 thermometric lag of aircraft, RP222
 Barometers and altimeters, testing, C46
 Barrel law, Federal, C64, C71, H11, H26
 Barrels and drums, steel, R20
 Barrier-layer photocell photometry, RP1348
 Bars, blocks, plates, and fixtures, sine, CS141
 concrete reinforcing, comparative bond efficiency, RP1755
 steel, and bar-sized shapes, carbon, hot-rolled, R222
 steel, color code for marking, R166
 steel reinforcing, R26
 steel, spiral, reinforcing, R53
 Base-combining capacity of cotton, RP1370
 Base-line tapes, C328
 Base metal thermocouples, stability, RP1278
 Bases, subway column, compressive tests, RP218
 Basic groups in textile fibers, RP1314
 Baskets for berries, C61
 Bast fibers, microscopic structure, RP1482
 Bathroom accessories, colors, CS63
 Batteries, dry, *see* dry cells
 flash-light, packaging, R104
 storage, *see* storage batteries
 Battery acid, nitrates and nitrites in, T149
 circuits, automobile, current and voltage, T186
 experimental diffusion, RP840
 Baumé hydrometer scales, C16, C19, C59
 hydrometer scales for sugar solutions, T115, C457
 hydrometer scales, temperature corrections, C295
 Bauxite, analysis, RP5, RP180
 Bauxites, high silica, extraction of alumina from, RP1691
 Bayonne Bridge, tests of steel columns, RP897
 Beacon, radio, (*see* Radio beacon and Radio range)
 Beams, concrete and hollow-tile, RP181
 concrete, shear tests, T314
 curved, (girder hooks), T260
 reinforced concrete, T2, T182
 steel tubing, T258
 Bearing alloys, white-metal, T188, RP512
 Bearing bronzes, RP13, RP68, RP205, RP401, RP442, RP551
 Bearing bronzes, thermal expansion, RP665
 Bearings, accelerated service tests, RP854
 ball and roller, friction and carrying capacity, T201
 journal, design, RP1037
 journal, friction, RP1295
 roller, taper, R67
 Beater practice in manufacture of offset papers, RP1455, RP1532
 Beckman spectrophotometer, performance, RP1798
 Bed blanket sizes, R11
 Beds, hospital, R24
 Bedsteads, springs, and mattresses, sizes, R2
 Beet pulp, enzymatic hydrolysis, RP1616
 preparation of vitamin C from, RP1594
 Beidellite, synthesis, RP819
 Bell-bottom screw jacks, R97
 Belting, leather, specification, C148
 Bender Body Company's "Bender Steel Home", structural properties, BMS27
 Bend test, T289
 for rope yarns, T300
 of steel welds, RP1444
 for paper, calibration and adjustment, T357
 Bends and traps, lead, CS96
 Benzein indicators polar structure, RP1263
 in acetanilide determination of, RP1600
 and dioxane, conductimetric titrations of acids and bases in, RP1794
 boiling and freezing points, density, and refractive index, RP1029
 boiling point and vapor pressure, RP1097, RP1365
 determination, in petroleum, RP311
 heat of combustion, RP1629
 indicators, dipole moments and resonance, RP1791
 thermal properties of, RP312
 Benzene hydrocarbons, heats of combustion and formation, RP1714
 purification, purity, and freezing points, RP1752, RP1760
 Benzoic acid, acidimetric standard, C25, C398, S183
 cell as a fixed point in thermometry, RP1647
 density and heat of combustion, RP1711
 expansion of solid, RP382
 heat of combustion, S230, RP721, RP1499, RP1619
 high purity, preparation of, RP1351
 standard sample for combustion, C25, C398
 purification by fractional freezing, RP1588
 Benzoinoxime, use in determining molybdenum, RP453
 Benzophenone, boiling point, S143
 Benzylcysteine, effect on polarographic determination of cystine, RP1211
 Berry baskets or boxes, specifications and tolerances, M85
 Beryllia systems and porcelains, RP1703
 Beryllium-copper alloys, thermal expansion, RP890
 and its alloys, properties, C346, S565
 reflecting power, RP39
 separation from aluminum, RP813
 thermal expansion, S565
 Bessel's functions, S100
 Bessemer steels, acid, S346
 Beta rays, measurement, RP1731
 Beta-ray counters, aluminum-tube, RP1666
 spectra of cobalts, RP1778
 Beverage bottles, R123
 containers, paper, R175
 Bifilar inductor, theory, RP1302
 Bimetallic wires, inductance, resistance, and skin effect, S252
 Binders board, R81, CS50
 Biological assays, optimum use of materials in, RP263
 Bismuth, alloys, C382, C388, RP248
 -silver thermopiles, S229
 spectrographic determination in tin, RP1451
 spectrum, S411, S490
 Bismuthinite, photoelectrical sensitivity, S322, S344
 Bituminous materials, softening point, RP142
 thermal properties, M97
 Bituminized-fiber drain and sewer pipe, CS116
 Blackboard, composition, R75
 slate, R15
 Black bodies as standards of color temperature, RP677
 "Black body" radiation, S204, S262, S284, S305, S357
 Blades, hack-saw, R90
 razor, packing, R69
 Blankets, bed (sizes), R11
 for hospitals, CS136
 heat-insulating qualities, T266, T347
 properties, RP1528, RP1529, RP1589
 wool and part-wool, CS39
 Blanket-sheet combination for outdoor use, RP1529
 Bleaching agents, laundry, C383, C424
 of raw sugar with chlorites, RP1436
 Blind landing of aircraft, radio, RP238
 underground antenna, RP1006
 Blinds, venetian, wood slat, CS61
 Blisters in enameled ironware, RP179
 Block sizes for calcimine brushes, R121
 Blood-counting instruments, S507

- Blood gas, analysis, RP680
pressure measurement, T352
- Blowpipes, oxyacetylene, cutting, T200
- Blue arcs of the retina, RP43
denim, specification, C265, C266
- Bluing, laundry, C383
- Board, binders, R81, CS50
box; thicknesses, R44
chip, for bookbinding, CS49
corrugated, single-faced (in rolls), for store use, R177
insulating, manufacture from cornstalks, M112
insulating, fiber, CS42
insulating, structural (vegetable fiber), R179
structural, insulating, R179
- Boards, building, fiber, M182, BMS50
fiber insulating, BMS13
fiber sheathing, accelerated aging tests, BMS69
fiber wall, properties, M132
sheathing, fiber, accelerated aging tests, BMS69
- Boards, tile, fiber, properties and performance, BMS77
- Bobbinet, specification, C359
- Bobbins for filling cop winders, hole sizes, R152
- Boiler plate, tensile properties, T219
performance, effect of soot, BMS54
plugs, fusible tin, T53, RP129
settings, brick for, T279
- Boilers, range; and expansion tanks, R8
range, (nonferrous), R181
steel, heating, horizontal firebox, R157
- Boiling point apparatus, RP796
amyl alcohols, RP1551
apparatus, continuous, RP379
apparatus, for stills, RP311
benzene, ethylene chloride, *n*-heptane, 2,2,4-trimethylpentane, RP1097
composition diagram, dioxane-water system, RP985
mixtures of D₂O and H₂O, RP947
of benzene, RP1029, RP1365
of deuterium, RP841
of ethyl ether and relation to pressure, RP922
hydrocarbons, method for calculating, RP1651
- Boiling points of normal aliphatic alcohols, RP940
and vapor pressures of *n*-heptane and 2,2,4-trimethylpentane, RP1280
and vapor pressures of hydrocarbons, RP1670
determination at low pressures, RP1142
of acetates of normal aliphatic alcohols, RP989
of benzene, 2,2,3-trimethylbutane, 3,3-ethylpentane, and 2,2,4,4-tetramethylpentane, RP1365
of normal aliphatic hydrocarbons, RP921
- Bolometers, S85, S188, S204, S244
- Bolt and nut standard proportions, M89
- Bolts and nuts, screw threads, M141
carriage, machine, and lag; packaging, R60
machine, carriage, and lag steel, stock production sizes, R169
electrical resistance of contacts between nuts and, RP215
plow, R23
standard proportions, H28 (1944)
stock-production sizes, R169
stresses in, RP386
tensile properties, RP763
- Bomb calorimeters, standardization, RP1499
- Bomb calorimetry, S230, C11
standard states, RP546
- Bombardment by low-speed electrons, radiation resulting from, RP297, RP371
- Bond efficiency, RP1756
clays, resistance between concrete and steel, T79, T173
strength, between mortar and brick, RP290
- Bonding layer of soldered joints in copper tubing, RP1465
mortar, refractory, air-setting, dry type, RP1461
- Bone char, properties, RP1479, RP1496, RP1674
plates, steel, CS37
- Bookbinding, chip board, CS49
cloths, buckrams, and fabrics for, CS57
- Book papers, effect of fiber components on stability, RP949
effect of filling and sizing materials on stability, RP1149
permanence studies of current commercial, RP349
printing tests, RP1180
- Books, composition, R84
preservation, M128
- Bookworm eradication, RP828
- Boots, rubber, specifications, C348, C349, C350
- Borax, use as pH Standard, RP1271
buffers, pH, RP1609
- Boric acid buffers, RP302
ionization constant of and pH, RP1609
- Boric oxide, crystalline, thermal expansion, RP-1425
- Boron, determination, RP1401
determination in steels and irons, RP1120
RP1705
in glass, RP882
- Borosilicate glazes, T31
- Bottles, carbonated beverage, R123
milk and cream; and bottle caps, R10
titration and conductivity measurements of aqueous solutions from, RP1426
- Boulangerite, photoelectric properties, S322, S446
- Boundary layers at interface of two liquids, velocity distribution, RP1591
- Bournonite, spectrophoto-electrical sensitivity, S451
- Box and open-end wrenches, R220
- Box dimensions, (hosiery boxes), T253, C169
- Boxboard thicknesses, R44
- Boxes, corrugated and solid fiber, for canned fruits and vegetables, R146
corrugated, fiber, for store use, E128
folding, paper, for store use, R127
folding, stock; for garments and dry cleaning, R172
folding, stock; for millinery, R173
folding, one-pound; for coffee, R64
paper, for toiletries and cosmetics, R200
set-up, paper, for store use, R126
wire-bound, rotary-cut lumber stock for, R59
wooden, for canned fruits and vegetables, R171
- Boyle's law, departures from, RP170
- Boys' button-on waists, shirts, junior and sport shirts, CS14
pajama sizes (woven fabrics), CS106
- Brackets in reinforced concrete frames, RP9
- Braille printing papers, RP690
- Brake lining, automobile, R66
small inertia-type machine for testing, RP1297
tests, effect of roughness of brake drums, RP1427
- Brakes and brake testing, safety code, M107
- Brass or bronze valves (gate, globe, angle, and check), R183
- Brass, cast red, effect of aluminum and of antimony on properties, RP1215
cast red, effect of gaseous impurities on properties, RP1553
corrosion as affected by structure, T108
ductility and strength, T83
failure, by "season cracking", T82, T83, T84, T103
internal stresses, S321, T82, T257, T285
magnetic susceptibility, T221
pipe nipples, CS10 (later combined with CS5)
thermal expansion, S321
traps, lavatory and sink, R21
trimmings for plumbing fixtures, specifications, C310
tubing, heat treatment, T285
- Brasses, etching characteristics, S435

- Brick, absorption properties of, RP88
and mortar, durability and strength of bond between, RP290
and tile walls, compressive strength, RP972
apparatus for transverse tests, T251
apparatus for transverse tests, portable, T341
common, R7
common clay, specification, C345
concrete-block walls, structural properties, BMS32
factors affecting strength, RP59
fire, melting points, T10
fire-clay, T159, T279, RP114
fire-clay, deformation, RP1030
fire-clay, panel spalling test, RP1630
fire-clay, elasticity, RP747
fire-clay, manufacture, properties, uses, and specifications, C282
fire-clay, specification, C299
machines, RP36
Manufacturers' Association wall construction, BMS23
masonry, RP683
masonry, beams, reinforced, RP504
masonry materials, volume changes, RP321
masonry walls, structural properties, BMS53
moisture penetration, RP1015
paving, vitrified, R1
piers, compressive strength, T111
refractory, creep and elastic behavior, RP1770
rough- and smooth-face, R7
sand-lime, R38
sand-lime, description and specification, C109
sand-lime, manufacture and properties, T85, T276
sand-lime, properties, RP1065
sand-lime, specifications, C347
silica, constitution and microstructure, T124
tile walls, structural properties, BMS24
transverse, compression, and absorption tests, T111
walls, compressive strength of sand-lime, T276
walls, compressive strength of steel columns incased in, RP520
walls, compressive tests, RP108
walls, permeability, BMS41, BMS55
walls, scum and effluorescence, T370
walls, structural properties, BMS23, BMS24
- Bricks, air and water permeability, RP1349
building, thermal expansion, RP1414
clay and shale, BMS60
- Bridge, Arlington Memorial, tests, RP609
columns, strength, T101, RP831, RP873, RP897
dual, for measurement of self inductance, RP1310
- Bridge-cable wire, stress corrosion, RP1604
- Bridges, Wheatstone, for resistance thermometry, S241, S288
- Bright-annealing of metals, RP1468
- Brightness, photometer for measuring, RP1646
meter for luminous materials, RP702
of black bodies, RP699
- Brinell and Rockwell numbers, relationship between, T334, RP185
hardness number, T11, M62
hardness, related to grain size of steels, S397
number, relation to tensile strength, RP185
testing of metals, RP903
- Brittleness, intercrystalline, of copper, T158
intercrystalline, of lead, S377
malleable cast iron, T245
secondary, of steels at elevated temperatures, RP164
- Broadcasting stations, conditions affecting distance range, T297
- Bromine, atomic weight, S193
oxidation of mannanuronic lactone, RP1727
reaction with furfural and related compounds, RP1276
spectrum, RP172
- Bromometric assay titration of potassium *p*-phenol-sulfonate, RP1558.
- 2-Bromopentane, boiling point, optical rotation, and refractive index, RP1551
- Bronze or brass valves (gate, globe, angle, and check), R183
- Bronze, aluminum, stress corrosion pitting, RP1366
bearing, RP13, RP68, RP205, RP401, RP442, RP551
bearing, thermal expansion, RP665
cast, changes upon annealing, T60
manganese corrosion under tensile stress, T135
pop safety valves, and bronze, iron, and steel relief valves, R204
- Bronzes, etching characteristics, S435
thermal expansion, RP1518, RP1550
- Brown denim, specifications, C256, C259
- Brush, carbon-terminals (electric), R210
wheels, dental, R116
- Brushes and brush shunts, carbon, R56
calimine, R121
counter, window, and radiator, R167
paint and varnish, R43
- Bubbler tips for use in gas-absorption pipette, RP1214
- Bubbling cap stills of glass, RP379
- Buckrams, CS57
- Buffer standards containing phenolsulfonates, pH of, RP1558, RP1559, RP1567
pH values, RP634, RP1495, RP1524, RP1559, RP1567, RP1580, RP1586
- Buffers, air-stable, RP302
borax, pH of, RP1609
effect of sodium chloride on ionization constant and pH borate, RP1721
p-phenolsulfonate, pH, RP1559, RP1567, RP1580
phenolsulfonate, salt effects on, RP1746
phosphate and chloride, pH values, RP1524, RP1648
- Buffing wheels, full disk, R115
- Builders' hardware (nontemplate), CS22, R18
hardware specifications, C275
template hardware, CS9
- Building Materials and Structures Reports (*see list p. 207*. Indexed also under specific subjects).
- Building boards, fiber, BMS4, BMS13, BMS50, M132
- Building code arrangement, BH8
Committee Reports, BH1, BH2, BH6, BH7
dwelling construction, BMS88, BMS107
requirements for design loads, M179
requirements for exits, M151
requirements for masonry, American Standard, M174
requirements for working stresses, BH9
- Building codes, preparation and revision, BMS19
columns, fire tests, T184
- Building construction, developing specifications for, BMS87
field inspector's check list, BMS81
fire-resistance classifications, BMS92
materials, absorption, RP88
materials, acoustics, S526, S552, RP149 (*see also Acoustics*)
Materials and Structures research, (general plan), BMS1
papers, stability, BMS35
stone, granites, RP1320
tile, hollow, R12
units, concrete, R32
exits, design and construction, M151
- Buildings, minimum live loads allowable in design BH7
plumbing for, BMS66
- Built-up roofing specifications, C170, C171, C172, C173, C174, C175, C176, C177, C178, C179
- Bulk of paper, RP69
- Buna S-gilsonite system, electrical and mechanical properties, RP1554.
- Bunsen flames, RP84
ice calorimeter, RP1796
- Bunting, wool, specification, C355
- Bureau of Standards, National, description of work, M18
publications, C24, C460
what it is and what it does, C1
- Burette, gas, S559
weight, for the micromasurement of liquid volumes, S555
- Burettes, glass, testing, C9, S92, C434
- Burs, dental, excavating, R195
- Burlap, jute, specification, C352

Burners, domestic, underfeed type, for Pennsylvania anthracite, CS48
 gas, design, T193, C394, RP446
 gas, effect of depth of ports, RP988
 oil, mechanical, automatic, CS75
 use in measuring flame velocities, RP900
 Bursting strength test for paper, RP278
 Bushel, legal weights, C10, M11, C425
 Butadiene, analysis by mass spectrometer, RP1664
 specific heat of vapor, RP1640
 1,3-Butadiene, thermodynamic properties, RP1661
 heat of formation and combustion, RP1628
 Butane, composition, manufacture, properties, and distribution, C420
 normal, heat of combustion, RP686
 Butanes, free energies and equilibria of isomerization, RP1440
 production, RP1747
 Butene, thermodynamics of, RP1592
 1-Butene, heat capacities, RP1804
 Butenes, vibrational frequencies, RP1768
 Butter tubs, wooden, R135
 color of, T92
 Butylbenzenes, purification, purity, and freezing points, RP1760
 Buzzer source of radio-frequency current, S95, C74.
 Byrd Antarctic expedition, studies of radio transmission, RP412

C

C₂, or second radiation constant, RP1189
 Cabinet, conditioning, for determining moisture content and water-vapor permeability, C453
 Cable, electric, terminology, C37
 equalizers, elevator, RP912
 Cadmium coatings, corrosion-protective value, RP867
 coatings, measurement of thickness, RP1240
 critical potentials, S317, S403
 electrode for storage battery testing, T146
 reflection, S45
 spectrographic determination in tin, RP1451
 spectrum, S411, S441
 sulfate, monohydrate, RP1389
 sulfate, solubility, RP1707
 vapor arc lamp, S371
 Cadmium-tin-lead-bismuth alloys, C388
 Caesium (*see also* Cesium)
 discharge, collisions in the positive column, RP485
 discharge, power input and dissipation in the positive column, RP455
 photoionization of, RP186, RP208, RP234
 recombination into the 1S level, RP274
 resonance and quenching of the third principal series line, RP184
 spectrum, S312, S386
 vapor, low-voltage arcs, S386
 vapor, neutralization of space charge by positive ion, RP138
 Cafeteria chinaware, R33
 Cal as accelerator in hardening portland cement, T174
 Calcia systems and porcelains, RP1703
 Calcimine brushes, R121
 Calcium aldonates, optical rotations, RP770
 aluminate hydrates, occurrence in system CaO-Al₂O₃-H₂O, RP1539
 aluminate in portland cement, T78
 aluminates, cementing qualities, T197
 aluminates, reaction of water on, RP34
 basic salts of aldonic acids, RP613
 chlor-aluminate hydrate, formation and properties of, RP34
 chloride compounds of D- α -glucophetose (D-glycero-D-gulo-aldoheptose), RP1555
 chloride, effect on concretes and cements, RP782
 chloride solutions, specific heat, S135
 critical potentials, S368, S403
 gluconate, basic calcium salt, RP436
 hydroxide solutions, activity coefficients of hydroxyl ion, RP584
 lactobionate-calcium bromide, preparation, RP-914
 lactobionate-calcium chloride, preparation, RP-618
 levulate, yield of levulose, RP832
 2-methylbutyrate, solubility in water, RP902
 oxide and hydroxide, heat of solution, RP1121
 oxide, binary system with boric oxide, RP510

oxide, phase studies with relation to portland cement, RP1699
 oxide, ternary system with ferric oxide and silica, RP1340
 silicate, decomposition by heat, RP381
 silicate, hydrated, formation at elevated temperatures and pressures, RP1147
 silicate, hydrated, X-ray patterns, RP1560
 silicate in portland cement, T78
 silicoaluminates, analogy to calcium sulfoaluminates, RP1623
 spectrum, S312, RP4
 sulfate, behavior at high temperatures, RP1413
 sulfate, heats of hydration and transition, RP1107
 sulphoaluminates of, RP54
 Calibration of testing machines with proving rings, C454
 Calking lead, CS94
 materials, durability and performance, BMS33
 Callendar radiobalance, S188
 Calomel electrodes, activity coefficients in electrolytes of, RP1495, RP1608
 electrodes, determination of dissociation constants, RP930
 half-cells, effect of temperature on, RP1018
 Calorie, mean, RP209
 Calorimeter, adiabatic, used in measuring thermodynamic properties of 1,3-butadiene, RP1661
 bomb, calibration, RP1619
 Bunsen ice, RP1796
 flow, for specific heats of gases, S503
 heat capacity measurements, RP844
 heats of fusion, RP607
 specific and latent heats of water, RP1228
 tables, gas, C65, C417
 Thomas recording gas, RP519
 twin bomb, RP470
 vapors, RP1640
 Calorimeters, aneroid, S247, S301
 bomb, C11, S230
 calibration, RP721
 gas, C48, T36
 vacuum-jacketed, S231
 water and steam, RP209, RP210, RP983
 Calorimetric resistance thermometers, S68, S200
 Calorimetry, combustion, S230
 fluid, RP168
 gases, RP1804
 ice, RP1260
 method of mixtures, S209
 vapor corrections in, RP1693
 Camera errors of photogrammetric mapping, RP1177
 "Camera finish" at the race track, RP986
 Camera lenses, airplane, resolving power and distortion, RP1216
 lenses, resolving power and depth of focus, RP1636
 lenses, testing, RP984, C428
 lenses, wide-angle airplane, characteristics, RP1498
 photographing alpha-ray tracks, RP171
 photographing cylindrical surfaces, S517
 photographing projectiles, T255
 Cameras, precision airplane, RP1428
 Camphor, cryoscopic constant, heat of fusion, and heat capacity of, RP353
 Canal rays, S23
 Candlepower, mean spherical, measurement by sphere, S447
 scale for precision photometers, S144
 standards, tungsten lamps, RP699
 unit, S50, C15
 Waidner-Burgess standard, RP324
 Candy sugar test, flow manostat for, RP1492
 Cane sugar, heat of combustion, S230
 Canned fruits and vegetables, wooden boxes for, R171
 Cans, fruit and vegetable (names, dimensions, capacities, and designated use), R155
 milk, fluid, R208
 tinned-steel, ice cream, R164
 Capacitance, edge correction in determination of dielectric constant, RP1217
 measurement with Maxwell bridge, S564, RP1137
 Capacitance and power factor of a mica capacitor as measured at the Bureau of Standards and the National Physical Laboratory, RP431

- Capacitors, air, energy losses, RP1212
air, power factors, RP1138
- Capacity, antennas, calculation, S568
electrical, absolute measurement, S10
electrical, coupled circuits, S126
electrical, distributed, between inductance coils
and ground, S427
electrical, inductance coil, S126, S175, S326, C74
electrical, measurement by Anderson's bridge,
S14
electrical, mica condensers as standards, S137
measures (volumetric), testing, C4
volumetric, standards, definition of units and
tables of equivalents, S17, C4, C47, M2,
M121
volumetric, tables for determining by weights of
water, C19
- Capillary electrometer with alternating voltages,
S90
- Caps, bottle, milk and cream; and milk and cream
bottles, R10
milk-bottle, paper tubes for packaging of, R218
paper, for ice-cream cups, R132
- Car wheels, thermal stresses, T209, T235
- Carat, metric, C43
- Carbohydrate content of collagen, RP1438
- Carbohydrates, chemical reaction of the chlorites
with, RP1408
classification of, RP1531
electronic interpretation of reactions, RP1573
enzymes hydrolyzing, RP1531, RP1526
reactions in alkaline solution, RP1497, RP1573
- Carbonyl, thermal expansion, RP960
- Carbon adsorbents, surface area by gas adsorption,
RP1674
analysis by combustion, RP1577
arc, radiometric measurements on, S539
bisulphide, ionization, RP927
brushes, R56, R210, M180
determination in high-sulphur steel, RP240
determination in steel and iron, T33, T141
disulphide, ionization, RP733
effect on magnetic properties of iron-carbon
alloys, S463
effects on pure iron, S453
heat of combustion, RP1619, RP1620
lamps, photometry, S115
monoxide, analysis of, RP1777
monoxide and water, heat of formation, RP1192
monoxide, determination, RP1396
monoxide from natural gas burners, T212
monoxide, heat of combustion, RP260, RP343
monoxide in products of combustion, T222
monoxide in steels, T126
monoxide, thermodynamic properties, RP1634
paper, C431
radiation constant, S105
resistor, T247
selective radiation, S131
spectrum, RP1062
steel, annealed, grain size, S397
steel bars and bar-size shapes, hot-rolled, R222
steel, eutectoid, magnetic properties, S408
steel, hardened, changes upon heating, S396
steel, heat treatment, T206
steel, hot rolled, T267
steel, martensitic, structure, S452
steel, properties at high temperatures, T219
steel, resistance to wear, RP348
steel, thermomagnetic investigation of tempering
RP350
steels and iron-carbon alloy, influence of initial
structure and rate of heating on austenitic
grain size, RP1481
tetrachloride for fire extinguishers, specification,
C134
thermal expansion, T335, RP693
thermodynamic properties, RP1634
use in reclamation of dry-cleaning gasoline, T280
- Carbon dioxide, analysis by thermal conductivity
method, T249
determination in presence of ethylene oxide,
RP1175
evolved from leather, RP1418
function in producing efflorescence on plaster
and cement products, RP1538
heat of formation, RP1139, RP1140, RP1141
heat of formation, from graphite and diamond,
RP1619, RP1620
steels, T126
thermodynamic properties, RP1634
vapor pressure, RP538
- Carbon-brush terminals (electric), R210
Carbon-oxygen equilibrium in steel, RP606
Carbonization, of lubricating oils, C99, T4
Carborundum, reflection, S45
Carburetors, atomization in, RP281
Carburetted water-gas, analysis of standard sample,
RP1704
Carburizing, effect of quality of steel, RP14
Care and repair of the house, BH15
Carius combustion tube, bursting pressures,
RP1521
Carao fiber, currency-type papers, RP1701
papermaking material, T340
Carotin and xanthophyll, absorption spectra,
RP337
Carpet wear testing machine, RP315
Carpets, plain velvet, specification, C354
testing, RP1505
wear of, RP640
Carpets and rugs, Axminster, specification, C353
Wilton, specification, C356
Carriage bolts, packaging, R60
stock production sizes, R169
Cartons, ice cream brick, R120
Cartridge-bag cloth, T268
Cartridge-inclosed fuses, T74
Cartridges, metallic, R62
Casehardening, soft spots obtained in, RP14
Casein and glue, comparative values for paper
coating, T323
Caselining materials, development of standards,
M182
paper, T312
Cases, flashlight, metal and fiber, R68
Cast-brass solder-joint fittings, R212
Cast iron, colorimetric determination of phos-
phorus, RP1386
enameled wares, T142
enameling, RP179
high-silicon, thermal expansion, RP1581
malleable, embrittlement, T245
parts for locomotive cylinders, T172
pipe, French and American, compared, T336
radiators, R174
sampling, RP237
wet process enameling, T246
white, graphitized upon annealing, T129
Cast irons, elastic properties, RP1447, RP1459
solidification shrinkage, RP440
Cast stone, physical properties, RP389
Casting clays aided by sodium salts, T51
Castings, overreduced steel, RP250
porous, resinous sealants for, RP1740
Catalysis by anions of the hydrolysis of proteins,
RP1503
Catheters, rubber, specification, C225
Cathetometer, precision, RP774
Cathode rays, ionization by, RP924
measurement, RP332
photographic registration, RP400
Cathode-ray oscillograph, RP460, RP636
Cathode sputtering, method of producing mirrors,
C389
Cathodic protection of underground structures,
C450
Caustic soda (lye), specification, C315
Cedar closet lining, aromatic red, CS26
shingles, CS31
Ceilings, insulation, BMS52
Cell for refractive index determinations, RP814
Cells, dry, *see* dry cells
soil-corrosion, electrode potentials and polariza-
tion, RP1336
standard, *see* standard cells
Celluloid, effects of heat, T98
infrared spectral transmission, S118
Cellulose, aldehyde content, RP1491
alpha-, beta-, and gamma-, volumetric determi-
nation in pulps and papers, RP979,
RP1068
behavior in cuprammonium solutions, RP1299,
RP1309
carboxyl content, RP1491
content in rubber goods, T154
content of paper, RP295
determination of aldehyde groups, RP1432
dissolving in cuprammonium, RP1442
fluidities in different solvents, RP1441
fluidity measurement in cuprammonium, RP1179
materials, spectral transmission, RP830
oxidation with periodic acid, RP1491
sulphite extract in leather, T215

- Cellulose acetate, chain length, RP1513
 films, RP1513
 fractionation, RP1490
 fractionation, heterogeneity, osmotic molecular weight, RP1654
 mechanical properties, RP1513
 molecular weight and mechanical properties, RP1655
 polymerization degree, RP1490, RP1513
 sheeting, protection of documents, M168
 viscosity, RP1490
- Cellulosic materials, determination of uronic acids, RP1268
- Celotex Corporation's wall and partition constructions, structural properties, BMS42
- Cement, action by salts in sea and alkali water, T12
 bags of paper, T187
 caustic magnesia, C135
 clinker, effect of heat treatment on microscopic structure, RP1358
 clinker, glass content, RP997, RP1066
 clinker, minor constituents, RP1074
 clinker, relation of compositions and heats of solution, RP1135
 clinker, structural characteristics of constituents, RP917
 concrete, tensile and compressive strength, RP1552
 concretes, stress deformation, RP970
 drain tile and concrete in alkali soils, T44, T95, T214
 effect of mineral oxides on inversion of dicalcium silicate in, RP1696
 efflorescence on, RP1538
 fineness determined by air analyzer, T48
 formation of hydrated calcium silicoaluminates from constituents of, RP1623
 garnet and hydrogarnet series in relation to setting of portland, RP1355
 high-alumina, reaction with water, RP34
 high-early strength, ten-year compressive strength, RP1508
 hydration at elevated temperatures and pressures, RP1147
 magnesia, specification, C323
 masonry, specification, C321
 masonry, ten year compressive strength and linear change, RP1548
 mixtures, portland, influence of magnesia, ferric oxide, and soda upon the temperature of liquid formation, RP132
 mortar and concrete, effect of steam curing, T5
 mortars, air-setting refractory-bonding of the wet type, RP1219
 particle size, RP777
 paste, relative humidity over, RP1334
 pastes, portland, heat of hydration, RP684
 sacks, relative merits of cotton and jute, T292
 sieves, performance, T29
 sieves, standardization, T42
 spark-plug electrodes, T155
 stucco, C311
 tile, durability in alkaline soils, T307
- Cement-lime mortars, T308, RP952
- Cementing qualities of calcium aluminates, T197
- Cement, portland (*see also* Concrete)
 calcium silicate and calcium aluminate in, T78
 clinker pastes, composition and physical properties, RP1530, RP1533
 composition, RP910, RP1131
 determination of magnesia, RP265, RP569
 determination of silica, RP891
 determination of sulphate, RP893
 determination of sulphide sulphur, RP968
 effect of calcium chloride, RP782
 effect of glass content upon heat of hydration, RP1127
 hardened with Cal, T174
 heat measurements, RP782
 high-early-strength, RP839
 high magnesia, T102
 hydration, T43, RP684
 magnesia in, RP884
 mortar and concrete, absorptive properties, T3
 nature of glass in, RP1324
 phase equilibrium studies involving potash, RP1421, RP1512
 phase relations, RP987
 phase studies, RP1699
 reaction with water, RP687
- relationship of the garnet-hydrogarnet series to sulfate resistance, RP1411
 specification, C33
 spectrographic analysis, RP1786
 spectrographic determination of alkalis in, RP1633
 steam test, T5, T47
 structure of tricalcium aluminate, RP1437
 X-ray method applied to study of constitution, RP233
- Cements, commercial masonry, RP746
 high-early-strength, behavior at various temperatures and humidities, RP799
 low-heat, properties and preparation, RP887
 masonry, RP683
- Cement-water paints and other waterproofings for unit-masonry walls, tests, BMS95
 ratio, influence on properties of vibrated concrete, RP1048
- Centrifugally cast steel, T192
- Ceramic bodies, effect of water on expansions of, RP98
 bodies of low absorption maturing at temperatures below 1,000° C., RP483
 bodies, oxides in, RP1703
 coatings for high temperature protection of steel, RP1773
 glaze fit, RP189
 kilns, temperature measurement, T40
 materials, analysis, RP180
 materials, decomposition, RP1331
 materials, thermal expansion, S485
 products, use of saggars in, RP827
 talcose whiteware, properties, RP1371
 ware, moisture expansion, RP472
 whitening, specification, C152
- Ceramics, use of talc in, RP848
- Cerium group, spectrophotometric analysis, RP-1395
 spectrum, S421
 Certification plan, M105
- Cesium, *see also* Caesium
 discharge, RP869, RP948, RP1036, RP1150, RP1162
 positive column, recombination radiation, RP565
 spectral intensity distribution, RP901, RP948
- CFR engines, effect of altitude on knock rating, RP1475
- Chain, welded, R100
- Chairs, folding and portable wooden, R80
- Chalks, crayons, and modeling clays for school use (types, sizes, and packing) R192
- Channel flow equation, RP1488
 slope and turbulence, effect on translation waves, RP1544
- Channels, turbulent flow in, RP1151
- Charcoal adsorbents, properties, RP1479, RP1496
- automotive fuel, RP1698
 coconut-shell, gas adsorption on, RP1674
- Charges, electric, measurement, RP306
- Charred records, deciphering, S454
- Charts, psychrometric, M143, M146
 testing lens resolution, M166
- Transmission Line Loading, NESC, M176
- Chasers for self-opening and adjustable die heads, R51
- Check list, inspector's, for building construction, BMS81
- Checks, bank, R50
 restaurant guest, R113
- Cheesecloth, specifications, C255, C257, C258, C365
- Chemical elements, atomic weights, numbers, symbols, and melting points, M126, M183
 glassware, properties, RP1394
 glassware, tests, T107, C434
 structure of wool, elasticity as related to, RP1486
 thermodynamics of hydrocarbons, RP1728
- Cherries, maraschino, glass containers, R197
- Chilling effect of moist fabrics, RP1587
- Chinaware, cafeteria and restaurant, R33
 dining-car, R39
 hospital, R40
 hotel, R5
 methods for testing, C202
 specifications, C202
- Chip board for bookbinding, CS49
- Chitin, infrared spectral transmission, S168
- Chlorides, potential differences across boundaries between solutions, RP74

- Chlorine, atomic weight, S81
isotopes, concentration by the countercurrent electromigration method, RP1767
spectrum, RP73, RP570, RP1244
- Chlorites, chemical reaction with carbohydrates, RP1408
use for treating raw sugars, RP1436
- 2-Chloropentane, boiling point, optical rotation, and refractive index, RP1551
- Chloroplatinate-chloroplatinite electrode, RP225
- Chloroplatinic acid prepared by electrolysis of platinum, S82
- Chlorosulphonic acid treatment of *n*-nonane, RP383
- Chlorous acid, reaction with oxycellulose, RP1491
- Chromatic illumination, surface colors, RP1285
- Chromaticity differences, estimation, RP944
scales from Maxwell triangle, RP756
sensibility, RP1099
- Chrome-vanadium steels, determination of vanadium, S161
- Chrome yellow, specification, C331
- Chromel-alumel thermocouples, RP767, RP1278
- Chromic acid anodizing baths, RP961, RP975
- Chromic acid and conductivity, density, RP198
- Chromic oxide, melting point, RP203
system, $\text{Cr}_2\text{O}_3\text{-SiO}_2$, RP203
- Chromium coatings, the porosity of electroplated, RP368
deposition from chromic acid baths, T346
deposition from solutions of chromic and chromous salts, RP604
deposition, theory, RP476, RP797
determination in steels, T6
electrolytic, thermal expansion, RP1361
oxide, band spectrum, RP423
plating, exposure tests, RP122, RP1293
plating, throwing power, RP131
reflecting power, S152, RP39
spectrum, S372, RP229, RP812
steel, thermal characteristics, S335
thermal expansion, RP1407
- Chromium and nickel plating on steel, accelerated tests, RP724
- Chromous solutions for absorption of oxygen in volumetric gas analysis, RP1112
- Chronograph, recording, for inverse rate method of thermal analysis, T230
- Chronometers, testing, C51, C392
- cis*-2-Butene, thermodynamic properties, RP1592
- Citrus fruits, effect upon human organism, RP1364
use of by-product for the preparation of galacturonates, RP1617
- City planning enabling act, a standard, BH11
primer, BH10
- Clamp, toggle, for testing rubber, RP1204
- Classification of iron and steel scrap, R58
- Clay, abrasive action of plastic, RP675
absorption properties of, RP88
columns, machines for extruding, RP36
concrete, RP529
fire, specification, C298
flow-point pressure, RP1186
hydrochloric acid process for production of alumina from, RP1756
length changes and endothermic and exothermic effects during heating, RP1243
length changes during initial heating, RP1311
minerals, synthesis, RP819
pot, casting of, C452
pots, refractory, attack by optical glass, RP1689
products, structural, glazes for, C436
properties, T227
refractories, testing, T7
sewer pipe and fittings, R211
tile, tests, T120
tiles for floors and walls, R61
working, bibliography of publications, RP36
- Clay-brick walls, compressive tests of, RP108
- Clays, American ball, T227
American bond, T144
analysis, RP180
colloidal matter, T23
colloidal nature and related properties, RP706
comparison of American and foreign, T262
dehydration, T21
domestic, substitution for imported clays in whiteware, RP1011
drying after preliminary heat treatment, S151, T1
effect of overfiring, T22
extraction of alumina from, RP1691
- fire, European, T79
modeling, crayons, and chalks for school use (types, sizes, and packaging) R192
plasticity, T46, T234, RP387
purifying and casting aided by sodium salts, T51
sagger, RP387, RP827
time in vitrification, T17
used in the preparation of fire-clay bricks, RP114
white-burning, eastern United States, C325
workable characteristics, RP36
- Cleaning, dry, fastness of dyes, RP80
materials, C383, C424
- Clearance lamps for vehicles, CS83
- Clinical thermometers, CS1
testing, C5, S13
- Clocks, testing, C392, C432
- Closet lining, aromatic red cedar, CS26
- Cloth, aeronautical, effect of weave, RP600
cotton jersey, and tubing, for work gloves, R194
cotton, properties, RP861, RP862
creaseability, RP555
hardware, CS132
window shades, R199
wire, fourdrinier, CS36
wiping, specifications, C267
- Clothespins, spring and slotted, sizes and packaging, R188
- Clothing, moist, effect on comfort, RP1587
- Cloud chamber, Wilson, RP437
- heights, daytime, optical measurement, RP1379
- Coal burners (for anthracite), CS48
coking tests, T134
high-volatile bituminous, sizes and terminology, M113
- Coal-tar pitch, specifications, C155, C157
- Coated abrasive products, R89
- Coating, glue, T323
paper, minerals and adhesives, RP254
- Coatings, protection of underground metals, RP-1446, RP1460
steel for high temperatures, RP1773
- Cobalt, absorption spectrum, S551
determination of, in steel, RP380, RP445
effect in storage batteries, RP1335
production of, by reduction with molybdenum compounds, RP1725
reflecting power, RP39
spectrum, S324
- Code, building, arrangement, BH8
building, recommended requirements for new dwelling construction, BMS88, BMS107
building, requirements for masonry, American Standard, M174
National Electrical Safety, discussion, grounding rules, H39
plumbing, BMS66
protection against lightning, H40
requirements for working stresses in building materials, BH9
- Codes, building, preparation and revision, BMS19
safety, (see Safety codes)
- Coefficient of restitution of a ball, RP1624
- Coercive power varying with magnetizing force, S384
- Coffee boxes, folding, R64
- Coil antenna, resistance at radiofrequencies, T330
antennas, S354, S428, S431, S480
- Coils, coaxial, circular, force between, S255
horizontal, field radiation of, S431
inductance, calculation, RP90
parallel, force between, RP615
radio-frequency resistance and inductance of, T298
- Cold work, effect upon recrystallization of bronze, T60
- Cold-rolling, cause of stresses, T163
effect on copper, RP1385
effect on surface layer of carbon-steel plates, RP1484
tests, open-hearth steel, T288
- Cold-working of copper, RP1210
- Collagen, amino nitrogen and arginine contents of, RP787
carbohydrate content, RP1438
chemistry of, C458
combination with HCl and NaOH, RP1119
combining weight of, RP765
electrophoresis and isoelectric point, RP1230
structure, RP434
- Collisions in the positive column of caesium discharge, RP485

Colloidal matter in clays, T23, RP706
 Colon tubes, rubber, specification, C221
 Color card standards, calibration, RP1700
 code for marking steel bars, R166
 comparator for incandescent lamps, RP252
 constancy as affected by surroundings, RP1285
 designations, basis for ISCC-NBS method, RP-1549
 designations for lights, RP1565
 equal-energy stimulus, filters for producing, RP652
 grading, Lovibond glasses, RP653, RP718
 manila rope fiber, RP627
 marking for anesthetic-gas cylinders, R176
 materials for art education in schools, CS130
 mica, effect of heat treatment on, RP1675
 perception versus brightness perception, S303
 pure, natural scale, S118
 school furniture, R111
 screens, pyrometer, S260
 sensitiveness, photographic emulsions, S439
 sensitivity of normal retina, asymmetry of, RP252
 specifications, computation, RP163
 standard for ruby mica, RP1671
 standardization of railroad signal glasses, RP1209
 stimuli, reduction of data on mixture, RP163
 system, Munsell, T167
 temperature, changes with operation of lamps, RP937
 temperature, estimation of nearest, RP944
 temperature of illuminants, S443, RP365, M114, RP937
 theory, dichromatic, RP1618
 triangle, uniform-chromaticity scale, RP756
 vegetable oils, RP815
 vision, S417
 white papers, T244
 Colorblindness, red-green, RP1618
 Color-Council system of color designations, RP1239
 Color-sensitive photographic plates, S422
 Color-temperature measurements, RP252, RP374, RP677
 standards, RP677
 Colorado River bed, scour, RP907
 Colorimeter, precision, S187
 Colorimetric analysis, stable sugar solutions for, RP536
 computation, O.S.A. excitation data, RP334
 determination of acetylene, S267
 determination of arsenic in alloys, RP1267
 determination of iron, S53
 determination of the colors of the TCCA standard color cards, RP1700
 method for determining silver, RP836
 method for phosphorus in steels, RP1386
 method of pH measurement of cyanide plating baths, RP1291
 purity, RP377
 Colorimetry, filters, M114
 signal lights, RP956
 sugar, RP878
 tolerances, RP1099
 Colors, bathroom accessories, CS63
 cast stone, CS53
 interference, of oxide films, and rate of oxidation of steels, RP1221
 kitchen accessories, CS52
 oxide films on metals, RP1468, RP1470
 paints, varnishes, and related products, R144
 railroad signal glasses, specification, RP1688
 sanitary ware, CS30
 Columbium properties, RP590
 separation from aluminum, RP86
 spectra, RP793, RP881, RP1656
 Column curves and stress-strain diagrams, RP492
 failure, Considere-Engesser theory, RP492
 splices, transverse tests, RP157
 Columns, building, fire tests, T184
 concrete, fire resistance, T272
 distilling, of high efficiency, RP1724
 gypsum fire protection, RP563
 rectifying, efficiency, RP1049
 reinforced concrete, strength tests, T122
 shelf angles welded to, RP230
 spruce, strength tests, T152
 steel, compressive properties of perforated cover plates for, RP1473, RP1474, RP1501, RP1514, RP1527, RP1540

steel incased in brick walls, compressive strength RP520
 steel incased in concrete, strength tests, RP873
 steel, strength tests, T101, T218, T258, T263, T327, T328, RP277, RP896, RP897
 strength of bridge, RP831
 tests of bases, RP218
 Coma, measurement, RP52
 Combustible gas in air, instruments showing, S334
 Combustion analysis, RP45
 apparatus for macroanalysis, carbon and hydrogen, RP1577
 calorimetry, S230
 carbon monoxide, RP1396
 heats of (see Heat of combustion)
 hydrocarbons, heats of, RP1728
 influenced by gas burner ports, RP988
 method for determining rubber, T35
 monoolefin, alkylbenzene, cyclopentane, and cyclohexane hydrocarbons, heats of, RP1702, RP1714, RP1715
 normal paraffin hydrocarbons, RP1607
 tubes, glass, bursting pressures, RP1521
 use in determining formula of a hydrocarbon, RP236
 Commercial forms (invoice, purchase order, and inquiry), R37
 testing laboratories, directory, M125, M171, M187
 Commercial Standards (see list, page 198. Indexed also under specific subjects)
 service and its value to business, CSO
 Commodity specifications, National directory, M65, M130, M178
 Comparator, extensometer, RP822
 Comparators, for length standards, S1, RP743
 Compass, radio, S423, S525, S536
 Compasses, aircraft, T237
 magnetic, S382
 Compensation of the aperture ratio markings of a photographic lens for absorption, reflection, and vignetting losses, RP1803
 Compensator, alternating voltage, RP1312
 Composite-coil electrodynamic instruments, RP411
 Composition blackboard, R75
 books, R84
 requirements, BMS105
 Compressibility, gases at their critical temperature, RP170, RP1493
 petroleum oils, RP244
 Compression cutting tests for rubber, RP674
 members, design, RP698
 tests of steel at elevated temperatures, RP741
 Compressive properties of stainless-steel sheet, RP1467
 strength of ten year concrete cylinders, RP1508
 Compressometer for textiles and similar materials, RP561
 Compressors, air, for automotive service stations and garages, R202
 tank-mounted, CS126
 Concentration cells, S165
 Concentration of isotopes of potassium by counter-current electromigration, RP1765, RP1766
 Concentric lines, use in radio-frequency amplifiers, RP856
 Concrete aggregate material, thermal expansion, RP1578
 alkali soils, T95, T214, T307
 beams, containing reinforcing bars, strength RP1669
 beams, effect of stress reversal, T182
 beams, reinforced, strength, T2, T233
 beams, shear tests, T314
 bond resistance, T173
 building units, R32, C304
 columns, fire tests, T184, T272
 columns, reinforced with cast iron, T122
 containing clay, RP529
 effect of calcium chloride, RP782
 effect of cement grain size on properties, RP777
 effect of materials and methods of preparation, T58
 effect of prehydration of cement and curing temperatures, RP887
 effect of temperature on stress-deformation relation, RP970
 electrolysis in, T18
 floors, structural properties, BMS51, BMS62
 floors, wear resistance, RP1252
 (Continued on next page)

- foundation walls, reinforced, structural properties, BMS26
 frames, effect of brackets, RP9
 joist construction floors, forms, R87
 measurement of vibration, RP1101
 porous, properties, BMS96
 portland cement, absorptive properties, T3
 portland cement, steam test, T5, T47
 pouring and pressure tests, T175
 protection against X-rays, RP1735
 reinforced-, arch test, RP609
 reinforced, floors and walls, structural properties, BMS20
 reinforced, width of cracks, RP1545
 reinforcing bars, comparative bond efficiency, RP1755, RP1756
 relative humidity inside, RP1334
 ribbed floor construction, forms for, R87
 sea and alkali water, T12
 slabs, tests of, T291, RP181
 unit walls, structural properties, BMS39, BMS40
 vibrated, properties, RP1048
 walls, nonreinforced monolithic, structural properties, BMS61
 Concrete-block walls, structural properties, BMS32, BMS38
 Concrete-encased steel columns, RP873
 Concrete-masonry walls, structural properties, BMS21, BMS22
 Concrete-reinforcement bars, deformed, areas and tensile properties, RP486
 Concretes, compressive and tensile strength, RP1552
 high-early-strength, RP799, RP1508
 X-ray protective material, RP1155
 Condensation, test floors, BMS103
 walls, BMS63, BMS106
 Condenser, electrical, compressed-air, S190
 plates, exponential shape, S235
 Condensers, electrical, air, C74
 electrical, testing and properties, S10, S64, C36
 energy losses in high-frequency electrical circuits, S190
 mica, as standards of capacity, S10, S137
 paraffined paper, S166
 power factor measurements, S18
 Condensing units, electric refrigeration, CS(E)107
 Conduction, electrical, in metals at low temperatures, S307
 heat through metal-enclosed insulation, RP207
 heat, theory, RP178
 Conductivity, chromic acid, RP198
 dielectric constant, power factor and, of the system rubber-calcium carbonate, RP1457
 electrical, of copper, S148
 thermal, metals, RP668, RP669
 thermal, of petroleum products, M97
 Conductor, four-terminal, S181
 pipe, R29
 Conductors, copper; (for building purposes), R180
 linear, inductance, S80
 resistance and inductance, S374
 Cones, paper, (for textile winding), R143
 warp and knitting yarn, basic dimensions, R152
 Conference, National, on Weights and Measures.
 See National Conference on Weights and Measures
 State utility commission engineers, M58, M66
 Connecticut Pre-Cast Building Corporation's "Twachtman" wall and floor constructions, structural properties, BMS20
 Consistometer for greases and plastic oils, RP188
 Constant, gravitation, determination, RP1480
 temperature and relative humidity cabinet, C453
 Constant-frequency generator, RP406
 Constantan, thermoelectric properties, S120
 Constants, critical, of 1,3-butadiene, RP1661
 physical, values, RP1189
 Contact potentials elimination, RP369, RP403
 Containers, cans, fruit and vegetable, R155
 cans, tinned, steel, ice-cream, R164
 colors for paints, varnishes, and related products, R144
 extracted honey, R156
 glass, for cottage cheese and sour cream, R148
 glass, for maraschino cherries, R197
 glass; for mayonnaise and kindred products, R131
 glass, for olives, R196
 glass; for preserves, jellies, and apple butter, R91
 lids, paper; for foods and beverages (heavy-duty, round, nesting type), R175
 packages for household insecticides, R203
 paints and varnishes, R144
 peanut butter, R209
 spice (tin and fiber), R170
 Contraction, *see* Expansion
 Contrast, photographic, S439
 sensitivity of the eye, S366
 Control system for electric testing laboratory, S291
 Convectors, testing and rating, CS140
 Conversion tables, pounds to gallons, gallons to pounds, T9
 Cooking oil, shortening, and salad oil, packaging, R193
 Coolers, drinking water, self-contained, mechanically refrigerated, CS127
 Cooling curves in thermal analysis, S99, S348
 rate of 24S aluminum alloy sheet, effect on corrosion, RP1378
 rate related to properties of carbon steel, S408
 tower fans, RP283
 Cooperating organizations, M96
 Cop winders, hole sizes for bobbins, R152
 hole sizes for taper tubes, R153
 Copper, C73
 alloys, etching reagents, S435
 alloys, thermal expansion, RP1518, RP1550
 citrate reagent for determination of sugars, RP1282
 conductors for building purposes, R180
 corrosion and pitting, T90
 corrosion in soils, RP1602
 crusher cylinders, T185
 determination, RP1417
 determination in dental gold alloys, S532
 effect of cold-rolling on hardness, RP742
 effect on red-shortness of iron, T261
 elastic properties, RP1459
 electrical conductivity, S148
 electro-deposition, C52
 electrotyping, C387
 electrotyping solutions, use of phenol as addition, RP228
 estimation of temperature, S121
 etching reagents, S399
 intercrystalline brittleness, T158
 microstructure, S399
 number of paper, T354, RP295
 pipe nipples, C85
 reducing values for sugars, RP1356, RP1638
 resistance-temperature coefficient, S147
 roofing, seams, RP216
 specific heat, S231
 spectrographic determination in tin, RP1451
 spectrum, S312, RP4, RP783
 structural changes in working, RP1210
 sulphate, infrared spectral transmission, S168
 sulphate solutions, S275
 texture due to cold rolling, RP1385
 thermal expansion, S410
 thermoelectric properties, S120
 tinned, weathering tests, RP422
 tubing, strength of lead-base sleeve joints in, BMS83
 tubing, strength of soldered joints, BMS58
 tubing, structural changes in bonding layer of soldered joints, RP1465
 water tube and copper and brass pipe, R217
 wire nails, R150
 wire tables, C31, M17
 Copper and copper oxide, emissivity, S128
 Copper and lead, electroanalysis, RP1213
 Copper-base alloys, determination of arsenic, antimony, and tin in, RP1116
 Copper-beryllium alloys, thermal expansion, RP890
 Copper-clad steel wire, resistance, S252
 Copper-constantan thermocouples, reference tables, RP1080
 Copper-nickel alloys, C100
 Copper-silver eutectic point, thermoelectric temperature scales, RP99
 Cordage fibers, testing, RP1611
 yarns, standard bending test, T300
 Core drill fittings, diamond, CS17
 Cornstalk fibers, separation of, M148
 Cornstalks, manufacture of insulating board, M112
 papermaking quality, M147
 production of pressboard from, M123
 use, M108
 Corona voltmeter, experimental study, RP21

Corrosion, accelerated tests on mild steel, RP42
 accelerated tests on zinc-coated steel, RP10
 aluminum, RP961, RP975, C346
 24S aluminum alloy sheet, RP1378
 aluminum alloys, RP1328, RP1788, C346
 bridge-cable wire, RP1604
 cells, soil, electrode potentials and polarization,
 RP1336
 electrolytic, influenced by varying frequencies of
 current, T72
 electrolytic, of iron in soils, T25
 inhibitors in air-conditioning equipment, RP1305
 magnesium and its alloys, RP964, C346
 manganese bronze under tensile stress, T135
 metals in soil. (see Soil corrosion)
 metals used in aircraft, RP1316
 open-valley flashings, RP123
 pipe line, correlation with soil characteristics,
 RP363
 pitting under stress, aluminum bronze and monel
 metal, RP1366
 protecting iron and steel from, C80, BMS8
 protection of steel (by painting), BMS102
 protective value of zinc and cadmium, RP867
 resistance of metals, determination of, T367
 resistance of ties for cavity walls, BMS101
 screen wire cloth, RP803
 steels, influence of cyclic stress, RP1307
 tests, electrolytic, RP101
 tests of painted steel or galvanized steel panels,
 BMS44
 tests of stainless steel, RP963
 underground structures. (see Soil corrosion)
 Corrugated board, single-faced (in rolls), (for de-
 partment and specialty store use), R177
 fiber-boxes (for department and specialty store
 use), R128
 Corrugated and solid fiber boxes for canned fruits
 and vegetables, R146
 Corundum, heat capacity, RP1797
 Cosmetics and toiletries, paper boxes for, R200
 Cosmic rays, deflection of, by a magnetic field,
 RP509
 in the stratosphere, RP1254
 Cossettes from Jerusalem artichokes, RP931
 Cots, rubber finger, specification, C226
 Cottage cheese containers, glass, R148
 Cotter pins, torque, RP386
 Cotton blankets, properties, RP1589
 cotton flannels for work gloves, R186
 cation exchange and acidic properties, RP1313
 cement sacks, relative merits of jute and, T292
 cloth for rubber and pyroxylin coating, CS32
 combination with bases (calcium and silver),
 RP1370
 deterioration by atmospheric exposure, RP294
 determination in textiles, RP821
 determination of aldehyde groups in, RP1432
 duck, R27
 duck, specifications, T264, C136, C166, C167
 effect of 1-percent NaOH and concentrated HCl,
 RP1146
 electrophoretic characteristics, RP1359
 fabric, asphalt-saturated for waterproofing, speci-
 fication, C287
 fabric tents, tarpaulins and covers, CS28
 fiber, microscopic structure, RP1362
 fluidities in different solvents, RP1441
 jersey cloth and tubing for work gloves, R194
 machinery technology, T282
 peptic substance in relation to growth, RP1326
 pillowcases, bleached, specification, C277
 Pima, for mail bags, T277
 rags for wiping machinery, specification, C261
 rope, specification, C326
 sheeting, brown, specification, C272, C278
 solubility in cuprammonium hydroxide solutions,
 RP1299, RP1309
 textiles, hospital and institutional, R74
 twine, polished, R124
 ultraviolet transmission, RP6
 velour, CS103
 waste, specifications, C262, C263
 yarns, breaking strength and elongation, RP1422
 yarns, effect of twist, T278, RP27
 yarns, mechanical properties, RP826
 yarns, mercerized, regain, CS11
 yarns, physical testing, T19
 Cotton-wool textiles, analysis, RP635
 Cottonseed, hull bran, RP152
 Coulometer, silver, S16 (See also Voltmeter)

Counter, miniature Geiger-Müller, RP1525
 Counters, Geiger-Müller tube, RP526
 Counting rate meter for pulses, RP1627
 Coupled circuits, S112, S126, S158, C74
 Cover plates, perforated, for steel columns, com-
 pressive properties, RP1473, RP1474,
 RP1501, RP1514, RP1527, RP1540
 Covers, tents, tarpaulins; cotton, CS28
 Cracks, tensile, in reinforced concrete, RP1545
 Crane, floating, strain-gage tests, T151
 Cranes, lifting, crawler mounted, revolving, (ex-
 port classifications), CS90E
 Crawl spaces, floors laid over, BMS103
 Crayons, chalks, and molding clays for school use
 (types, sizes, and packaging) R192
 Crazeing of glazes on ceramic bodies, RP189
 Crease-resistant finishes for fabrics, evaluation,
 RP1077
 Creasing tester for paper, calibration and adjust-
 ment of, T357
 Creep, nickel-chromium-iron alloys, RP572
 rates of monel metal, RP1462
 steels at high temperatures, T362, RP192, RP481
 tensile and compressive, of refractory bricks,
 RP1770
 Creosote-oil distillation thermometers, T49
 Critical constants of gases, review of literature,
 S541
 cooling rate of iron-carbon alloys and carbon
 steels, effect of carbon, RP1092
 radio frequencies, comparison with sunspot
 activities, RP913
 solution temperatures; mixtures of gasoline,
 ethyl alcohol, and water, RP560, RP571
 Critical-frequency measurements of ionosphere dur-
 ing solar eclipse, RP868
 Cross-connections in plumbing systems, RP1086
 Cross-sectional areas, determination by volumetric
 methods, RP1258
 Crucibles, slip-casting from special refractories,
 RP1236
 Crude oils, method for determining the components
 of, RP1387
 Crumpling test for currency paper, RP1390
 Crushed stone aggregates, coarse, R163
 Crusher cylinders, copper, T185
 Crush-resistant finishes, evaluation of, RP1047
 Cryoscopic constant, heat of fusion, and heat
 capacity of camphor, RP353
 constants of hydrocarbons, RP1734, RP1752,
 RP1760
 Cryostat liquids, nonflammable, S520
 precision, RP284
 thermocouple calibration, RP1339
 Cryostats, measurement of uniform temperature,
 RP1158
 Crystal detector, S94, S140, S157, S450, C74, C121
 grains, refractive indices, RP814
 radio receiver, C120, C121
 structure of garnet-hydrogarnet series, RP1355
 structure of tricalcium aluminate, RP1437
 Crystal-units, quartz, electrical characteristics,
 RP1774
 Crystalline rubber, effect of pressure on melting,
 RP1677
 Crystallization, fractional, purification by, RP1588
 unvulcanized rubber, RP1718
 Crystals, gravitational anisotropy in, S482
 refractive index by immersion, RP829
 Cubic-foot standard for gas, T114
 Cupola refractories, R154
 Cuprammonium, solution of cellulose in, RP1442
 solution, preparation of standard, RP1179
 Cupric chloride, infra-red spectral transmission,
 S168, S191
 Cuprous oxide, spectrophoto-electrical sensitivity
 of, S462
 Cups, ice-cream, and cup caps, R132
 Curbstone, granite, R102
 Curl of paper, RP1522
 Curren Fabrihome Corporation's "Fabrihome"
 constructions, structural properties,
 BMS11
 Currency paper, experimental production, RP121,
 T329
 wear quality, RP1390
 Currency-type papers, wearing quality, RP1701

Current balance, use in absolute determination of
ampere, RP615, RP685, RP1200, RP1449
distribution in linear electrical conductors, S531
meters, water, performance, RP981
radiofrequency, measurement, S157, S206
transformers, accuracy, RP775
transformers, effect of wave form on performance,
RP1041
transformers, testing, RP580
Curtains, theatre proscenium, fire tests, RP603
Cushions, cloth-inserted ring, specification, C254
rubber ring, specification, C246
Cuticle in wool, composition, RP1579
Cutters, milling, R36
Cutting fluids, T204
Cyanide plating baths, measuring pH, RP1291
silver-plating solutions, analysis, RP384
Cyanides, alkali, purification and analysis of,
RP323
Cyclohexane, ethyl, from petroleum, RP817
isolation from petroleum and properties, RP360
Cyclohexane hydrocarbons, heats of combustion of
five, RP1715
vapor pressures and boiling points, RP1670
Cyclohexanes, heats of formation and combustion,
RP1728
infrared absorption spectra, RP1769
Cycloparaffin hydrocarbons, purification, purity,
and freezing points, RP1760
Cyclopentane hydrocarbons, heats of combustion
of four, RP1715
vapor pressures and boiling points, RP1670
Cyclopentanes, heats of formation and combustion,
RP1728
infrared absorption of, RP1769
Cyclopentene, purification, purity, and freezing
points, RP1752
Cylinder, wire-wound, elastic problem, RP344
Cylinders, anesthetic gas; color marking, R176
circular, air forces on, S394
sound-absorbent, absorption and scattering by,
RP1709
Cylindrite, photoelectric properties, S322, S344
Cystine, oxidized wool, RP998
polarographic determination, RP1211
role in structure of wool, RP1405
wool, effect of alkali, RP1203
wool, photochemical decomposition, RP1255

D

Dahlia, levulose from, S519
Dam, rubber, specification, C218
Damp proofing, asphalt for, specification, C160
coal tar for, specification, C155
materials for concrete, T3
Damping of radio waves, S235
waves in mercury, S289
Davis-Gibson filters, M114, RP374
Daylight, artificial, filters for reproduction, M114
Dead-weight testing machines, C446
Deairing, effects on ceramic whiteware, RP1371
Decalcification of teeth, RP1563
n-Decane, isolation, from petroleum, RP438
Decarburization of ferrochromium by hydrogen,
S448
Deck surfaces, slipperiness, BMS100
Decrement method of resistance measurement,
S189, C74
Decremeter, S235, C74
Dehydration of clays, T21
Dehydrating agents, efficiencies, RP1603
Demagnetizing iron in magnetic testing, S78
Demulsibility of oil, T86
Denim, brown, specifications, C256, C259
indigo blue, specifications, C265, C266
Densities and boiling points of normal aliphatic
alcohols, RP989
of gases, S529, C279, M71
hydrocarbons, method for calculating, RP1651
synthetic rubbers, RP1507
Density and composition of glass, RP1197
and heat of combustion of benzoic acid,
RP1711
balance for liquid hydrocarbons, RP1685
1,3-butadiene, RP1661
change of gasoline with temperature, RP393
chromic acid, RP215
indium, RP1541
iron and steel, S562

leather, RP1556
molasses, T345
petroleum vapors, M97
rubber-sulfur compounds, S560
of sugar solutions, C457
tables, standard, C19
tanning extracts, C449, RP1612
thermal-, coefficients for vegetable tanning
extracts and hydrometer correction
tables, C449
Dental amalgam alloys, analysis, RP1391
brush wheels, R116
excavating burs, R195
gold alloys, analysis, S532, RP1103
hypodermic needles, R108
lathe grinding wheels, R130
materials, physical properties, T157, RP32,
C493
mirrors, cone-socket, R137
plaster, packaging, R117
rubber (base and veneering), R138
Dentifrice, effect upon teeth, RP1563
Deodorant, hypochlorite, liquid, CS68
Deoxidation of steel for castings, RP199
Derivatives of physical quantities, S331
Desensitizers, photographic, RP541
 β -D-2-Desoxygalactose, preparation and properties,
RP1190
Detector, crystal, S94, S140, S157, S450, C74, C121
electrolytic, S22, S36, S140, C74
electron tube, S140, C74, C133
for radioactive contamination, RP1223
Detectors, electrical oscillations, S140
Detergent materials, C383, C424
Deterioration, see material in question
Deuterium concentration, RP729
conversion of deuterium oxide into, RP1050
oxide, boiling-point composition diagram,
RP947
oxide, electromotive force of standard cells
containing, RP1094
oxide, heat and free energy of formation,
RP1287
oxide in standard cells, RP1435
oxide, solubility of CdSO₄ in, RP1707
properties, RP841
Deuteranopic vision, RP1618
Developers, photographic, RP598
Development, effect on sensitivity, RP355
Dew points of fuel-air mixtures, S500
Dewpoint, determining, M143, M146
Dewar flasks, silvering and evacuating, RP385
Dewey decimal system (for radio), C385
Dextrose, analysis, RP1638
determination, RP1417
oxidation, RP436
solubility in sugar mixtures, T259
solubility in water, S437
solutions, density, S293
specific rotation, S293
Dial indicators, CS(E)119
Dial micrometers, T226
Dials, self-luminous, brightness measurements,
RP804
Diamond core drill fittings, CS17
cutting and sawing by electric arc, RP1657
die production, electrical methods, RP1787
heat of combustion of, RP1140, RP1141, RP-
1620
indenter, RP1220
powder, size grading, RP1716, CS123
thermal expansion, RP693
thermodynamic properties, RP1634
Diaphragm capsule, sensitive, RP1270
packing, specification, C240
Diaphragm-type pressure indicators, RP1368
Diaphragm for X-ray standard ionization chamber,
RP119, RP271
Diazomethane, reaction with silk and other pro-
teins, RP1338
Dicalcium silicate, crystal structure, RP1782
effect of mineral oxides on inversion, RP1696
solid solutions, microstructure, RP1570
Dichromatic vision, RP1618
Dickite, synthesis, RP819
Dicyanin, as sensitizer of photographic plates, S318
Die, diamond, electrical methods for production,
RP1787
Die-head chasers, R51

- Dielectric constant, edge correction in determination, RP1217
insulating materials, S471, T216
rubber-sulphur compounds, S560
power factor, and conductivity of the system
rubber-calcium carbonate, RP1457
power factor, and resistivity of rubber and
gutta-percha, T299
of trioxane, RP1596
Dielectric properties of barium-strontium titanate,
RP1776
of foreign and domestic micas, RP347
Dielectrics, effect of imperfect, S269, C74
solid, S234
Dies, flow of plastic material through forming,
RP36
wear by plastic clay, RP675
Diesel engines, atomization in, RP281
Diesel and fuel oil engines, CS102E
Diffraction patterns, X-ray, (*see* X-ray diffraction)
Diffusing media, properties, RP704
Diffusion battery for extraction of artichokes, RP-
840, RP1025
Diffusion-current constants in polarography,
RP1631
Difructose anhydride, and anhydrofructose, RP224
hexacetate, RP79
occurrence in inulin, RP251
II and III, RP299
II, structure, RP1784
III, methylated, preparation, RP1277
Difructose anhydrides, reaction of periodic acid on,
RP1683
Diheterolevulosan, reaction of periodic acid on,
RP1683
Dilatation of low carbon steel, RP1742
thermal, of glass at high temperatures, S393
Dilatometer, expansion of benzoic acid, RP382
interferential, S365
studies of the crystallization of rubber,
RP1718
p-Dimethylaminobenzalrhodanine, use in determi-
nation of silver, RP836
2,3-Dimethylbutane, determination in petroleum,
RP311
Dimethylcyclohexanes, separation from petroleum,
RP808
1,1-Dimethylcyclopentane in petroleum, RP542
2,6-Dimethylheptane, preparation, properties, and
presence in petroleum, RP1184
2,2-Dimethylhexane in petroleum, RP1800
Dimethylcyclohexanes, heat of combustion and
isomerization, RP1783
Dimethylpentane in petroleum, RP458
Dining-car chinaware, R39
Diophantine quantities, determination, RP145
Dioxane-water system, boiling-point—composition
diagram, RP985
Dipole moment and structure of trioxane, RP1596
moments of benzein indicators, RP1791
Direction finder, aircraft, radio, RP621
radio, high-frequency, S525
radio, in navigation, S428
radio, portable, S536
Direction finding, radio, S353
signal systems for vehicles, CS80
Directional effect on elastic and plastic properties,
RP1742
Directive radio transmission, S469, S480
Director's annual report (*see* Reports, annual)
Directory of commercial testing and college re-
search laboratories, M125, M171, M187
of commodity specifications, M65, M130, M178
Disaccharides, enzymatic hydrolysis, RP1398
Discharge coefficients of orifices, RP49
Dishes or trays, food (waxed paper, molded wood
pulp, and wood types), R187
Disinfectant, hypochlorite, liquid, CS68
phenolic, emulsifying type, CS70
phenolic, soluble type, CS71
pine oil, CS69
Disks, master, CS(E)124
Dispersion, specific, of glasses, RP1352
Displacement law, Wien's, S180
Dissociation of sulfonic acids, RP1558, RP1559, RP-
1567
Dissociation constants by electrometric titration,
RP930
formic and acetic acids from electrometric
titration, RP1537
of acid mixtures, RP889
of phenols and optical rotations, RP1399
of p-phenolsulfonic acid, RP1559
o-phthalic acid, RP1678, RP1687
potassium p-phenolsulfonate, RP1686
second, of phosphoric acid, RP1524
Distillation, apparatus for, RP1724
azeotropic, separation of hydrocarbons, RP-
1402
column, rotary, RP1201
columns, reflux regulator and head, RP1249
method for spectrographic analysis, RP1753
molecular, apparatus for, RP1739
of n-nonane from petroleum, RP883
petroleum, RP280
petroleum fractions containing methylcyclo-
pentane, RP375
rectifying stills of glass, RP379
Distilling column, chain-packed, RP579
reflux regulator and head for, RP1615
Dithizone method for lead sulfate, RP1165
Divers' hose, specification, C289
Djenkolic acid, effect on polarographic determina-
tion of cystine, RP1211
Documents, preservation, M128, M140, M142,
M144, M145, M154, M158, M162, M168
Dolomitic limes, hydration of magnesia, RP1022
Domestic burners, underfeed type, for Pennsylvania
anthracite, CS48
Doors, entrance, factory-fitted Douglas fir, CS91
Doors, hollow metal single acting swing, R82
Doors, kalamein, R83
old growth Douglas fir standard, CS74
standard stock Douglas fir, CS73
standard stock ponderosa pine, CS120
Dopes for aircraft fabrics, use of plastics, RP1098
Dosage measurements, X-ray, (*see* X-ray dosage)
Doubletires, R134
Douglas Fir Plywood Association, wood-frame wall
construction, structural properties, BMS-
30.
Douglas-fir plywood (domestic grades), CS45
old growth, standard stock doors, CS73
standard stock doors, CS73
Drafts, notes, bank checks, R50
Drain and sewer pipe, bituminized-fiber, CS116
Drain tile, cement, in alkali soils, T44, T95, T214,
T307
Drawing ink, waterproof, specifications, C196, C301
Dress fabrics, woven, testing and reporting, CS59
patterns, CS13
Dressings, first-aid unit, packaging, R178
surgical, R133
Drier, liquid paint, specification, C105
paint, detection of resin, T66
Drill fittings, diamond core, CS17
specification, C367
Drills, electric portable, CS93
Drinking water coolers, self-contained, mechanical-
ly refrigerated, CS127
Dropping test for thickness measurements of zinc
and cadmium coatings, RP1240
Dropping-mercury electrode, application to investi-
gation of polyhydroxy acids and lactones,
RP1448
Drums and steel barrels, R20
Dry cells and batteries, specifications, C139, C390,
C414, C435
characteristics and testing, T171, C79
voltage at low temperatures, S434
voltage and hydrogen-ion concentration, S364
Dry cleaning, effect on silks, T322
fastness of dyes, RP80
furs, T360
materials, C424
reclamation of gasoline, T280
solvent, Stoddard, CS3
stock folding boxes for, R172
Drying agents, efficiencies, RP649, RP1603
clays, effect of preliminary heat treatment, T1,
S151
conditions, effects on textiles, RP1337
Duck, cotton, R27
cotton, specification, T264, C136, C166, C167
grey, specifications, C166, C167
Dunn Manufacturing Company, walls, BMS22,
BMS38

"Dunstone" walls, structural properties, BMS38
 "Dun-Ti-Stone" walls, structural properties, BMS22
 Duralumin, C76, C346
 corrosion, RP1328
 heat treatment, S347
 thermal expansion, S497
 ultra-violet reflecting power, S493
 Dwelling construction requirements, BH1, BH2, BH18, BMS19, BMS88, BMS107
 Dyeing, related to titration curve of wool, RP1286
 of wool with acid dyes, RP1012, RP1510, RP1511
 Dyes, combination with wool, RP1377
 fastness to dry cleaning, RP80
 monoazo, spectral absorption, RP47
 photographic sensitizing, RP173, RP488
 spectral transmittancy, S440
 used for stains, T250
 Dynamical similarity, aerodynamics, S394
 Dynamometer for tire tests, T213
 tests of tires, T240
 Dysprosium, spectrophotometric determination, RP1456
 spectrum, S466

E

Earth, mean density, RP256
 -current meter, T351
 resistance related to electrolysis of under-ground structures, T26
 resistivity measurements, S258
 resistivity related to soil corrosion, RP298
 wall constructions, BMS78
 Earthenware plumbing fixtures, CS111
 Earthquake loads, M179
 Eaves trough, conductor pipe, fittings, and ridge rolls, R29
 Ebullimetry, water as a reference standard, RP-1088
 Ebullioscope for measuring boiling points of compounds of high molecular weight, RP796
 Ebullioscopic determination of molecular weights of petroleum fractions, RP772
 Eclipse, solar, radio observations, RP629, RP868
 Eclipses, solar, predictions of critical radio frequencies, RP1279
 Edison storage battery, C92
 Eddy currents, effect in core of circular wires, S544
 Edge corrections in determination of dielectric constant, RP1217
 Education, art, color materials for, in schools, CS130
 Efflorescence of cement affected by Cal, T174
 on brick walls, T370
 on plaster and cement products, RP1538
 on stone, T349
 Efflux of gases through small orifices, S359
 Effusion method of determining gas density, T94
 Egg albumen, titration curve, RP1377
 Elastic behavior of refractory bricks, RP1770
 calibration devices, RP1726
 constants of some structural materials, RP1742
 instability, problems, RP1163
 problem of a wire-wound cylinder, RP344
 properties of cast irons, nickel, copper, open-hearth iron, and alloy steels, RP1447, RP1459
 properties of some structural materials, RP-1742
 shoe goring, R112
 Elasticity, modulus for clays at different temperatures, RP387
 of concrete, RP970
 of wool as related to chemical structure, RP1486
 Electric arc, diamond cutting by, RP1657
 charge, indeterminateness, S566
 charges, measurement of small, RP306
 currents on pipe lines, RP298
 equipment and lines, safety rules for operation, C49, H8, H34
 fences, safety rules, H36
 lamps, efficiency, S30, S113, S253, C13
 lamps, incandescent, specifications, C13
 meters, watt-hour, C56
 quantity, measurement, S139
 railway material, packaging, R65
 railways, current leakage, T63, T75

railways, construction and maintenance of bonds, T62
 refrigeration condensing units, CS(E)107
 service standards, C56
 supply and communication lines, safety rules for installation and maintenance, H32
 testing laboratory control system, S291
 units, absolute determination of ohm and ampere, RP1606
 utilization equipment, safety rules, H7, H33
 wire and cable terminology, C37
 Electrical characteristics of quartz crystal-units, RP1774
 conduction in metals, S307
 current and voltage waves, analysis, S119, S203
 instruments, torque of, S145
 insulating materials, S471, T216 (*see also* Dielectrics and specific materials.)
 line construction, H10, H32
 lines, overhead, wood poles, H16
 measuring instruments, C20
 methods for diamond die production, RP1787
 oscillation detectors, S140
 oscillations, S95
 oscillations in antennas and inductance coils, S326
 practice in mines, C23
 properties of rubber and gutta-percha, change under water, RP213
 properties of Buna S rubber, RP1554
 properties of rubber-sulfur compounds, S560
 resistance of contacts between nuts and bolts, RP215
 safety code, C54, H3, H4, H6, H7, H8, H9, H10, H30, H31, H32, H33, H34, H35, H36, H39
 safety code, scope and application, C72
 standards, international comparison, RP448
 supply stations, safety rules for installation and maintenance, H31
 systems, grounding, T108
 testing fees, C6
 transmission lines, loading charts, M176
 units, absolute determination of ohm and ampere, C459, RP1606
 units and standards, S3, S65, S66, S102, S292, C29, C60, M16
 waves in conductors, reflection, S114
 Electricity, static, C488
 Electrochemical equivalent of silver, S171, S194, S201, S218, S220, S271, S285
 Electrode, cadmium, for storage battery testing, T146
 calomel activity coefficients in electrolytes of, RP1608
 chloroplatinate-chloroplatinite, RP225
 dropping-mercury, RP1448, RP1631
 equilibrium of standard cell, S71
 function of glasses, RP1743
 glass, use, RP1495
 holder for spectrographic analysis, RP1515
 hydrogen, preparation, types, and behavior, RP1598
 lead amalgam, electromotive force, RP1697
 metal connected glass, RP511
 potential of sodium, RP1350
 potentials, S504, RP930
 potentials in soil-corrosion cells, RP1336
 resistance, RP905
 silver-silver chloride, RP1108, RP1749
 Electrodeposited gold coatings, method for determining thickness, RP1694
 Electrodeposition, from chromic and chromous salt, RP604
 of iron, rapid, RP991
 Electrodeposits, measurement of thickness, RP866, RP994, RP1081
 Electrodes, glass, voltage departures and solubility, RP1187
 nickel, spark plug, T143
 quinhydrone and hydrogen, in solutions containing tannin, RP176
 silver-silver bromide, chloride, and iodide, reproductibility, RP1183
 Electrometer, absolute, for measuring high alternating voltages, RP1078, RP1079
 capillary, S90
 clearance and displacement of attracted disk RP17
 vibration, S239

- Electrometric titrations in cells without liquid junction, RP1357
- Electromigration method for the concentration of isotopes, RP1765, TP1766, TP1767
- Electromotive force, precise measurements, C21
- Electron attachment in the ionosphere, RP1342
- configuration of uranium, RP1729
- counter, Geiger tube, RP165, RP167, RP191
- low-speed, bombardment, of metals, RP297
- radiation, RP478, RP493
- scattering by ions, RP535
- spectrometer, magnetic-lens, RP1778
- tube, action as modulator, S423
- tube amplifier, C141
- tube amplifier detector, C133
- tube detector, S140
- tube emission, S317
- tube generators, S355
- tube input impedance, S351
- tube transmitter of completely modulated waves, S381
- Electrons in lead and calcium vapors, S368
- Electrophoresis and isoelectric point of collagen, RP1230
- of fibroin, sericin, and silk, RP1234
- of nylon, RP1376
- of wool, RP1245
- Electrophoretic characteristics of cotton fibers, RP1359
- Electroplated coatings, effects of methods of polishing steel on protective value, RP1645
- Electroplating, chromium, throwing power, RP131
- copper, S275, C52, C387
- black nickel, T190
- zinc, T195
- Electrostatic field of slotted conductor, S542
- voltmeter, RP404
- Electrotypes, dimensional changes in manufacture, RP308
- Electrotyping, copper, S275, C52, C387
- Electrodialytic estimation of ash, RP1314
- Electrodynamometer, standard, RP1344
- Electrodynamometer, absolute, S27, S28, S56
- compensated, S48
- tubular, for heavy currents, S184
- Electrogalvanizing, T195
- Electrolysis from electric railways, mitigation, T27, T32, T52, T54, T55
- in concrete, T18
- isotopic fractionation of hydrogen and oxygen, RP729, RP820
- isotopic fractionation of water, RP601
- of platinum black, S82
- prevention by insulating coatings on underground structures, T15
- relation to electric railway track leakage, T63, T75, T127
- stray-current, abstracts and summaries of Bureau publications, C401
- surveys, T28, T351, T355
- underground structures, relation to earth resistance, T26, T127
- Electrolytic cells, potential drop in electrodes, RP905
- corrosion influenced by varying frequencies of current, T72
- corrosion of iron in soils, T25
- corrosion tests, effect of oxidizing conditions, RP101
- determination of copper, RP384, RP1213
- determination of lead, RP1213
- iron strip, T288
- resistors, RP1126
- Electromagnetic waves, direction of propagation, S353
- Electrometer, absolute, for measuring high alternating voltages, RP1078, RP1079
- capillary, S90
- Electrotyping, copper, S275, C52, C387
- copper solutions, use of phenol as addition agent, RP228
- Elements, hydrolytic behavior, RP1519
- melting points, M126
- Elevator accident statistics, T202
- cable equalizers, RP912
- Elevator hoistway and equipment maintenance, C441, C442, C443, C444
- interlocks, T202
- safety code, C441, C442, C443, C444
- Elinvar hairsprings for watches, RP670
- Elliptic integrals, tables, S169
- Elongation of silk yarns as affected by humidity, RP1353
- Emanation pipette, RP339
- Emission and absorption of radiation by metallic silver, RP421
- Emissivity, acetylene flame, S191
- metals and oxides, S224, S242, S243, S249
- of paints, T254
- of platinum, S243
- of various substances, S121, S198, S224, S242, S243, S249
- tungsten filaments, S300
- Empire State Building, wind pressure on model, RP545
- Emulsification of oil, resistance to, T86
- Emulsion, photographic, after-ripening, RP340
- photographic; silver ion-gelatin equilibrium, RP376
- Emulsions, photographic, RP646, RP659
- sensitization, RP20, RP173, RP622
- sensitometry, S439, RP598
- Enamel frits, consistency, RP1063
- surface tension, RP1133
- Enamel, porcelain (fusibility), RP524
- red, water-resisting, specification, C146
- slips, consistency, T356
- Enamelled cast-iron wares, T142
- iron, porcelain, weather resistance, RP1476
- ironware, specifications, C310
- porcelain, steel utensils, multiple-coated, CS100
- ware, cast-iron, CS77
- Enameling of cast iron, blistering, RP179
- Enamels, determination of fluorine and silica, RP110
- determination of thickness, RP1315
- for sheet iron and steel, T165
- reflectometry of porcelain, RP847
- thermal-expansion, RP1172
- vitreous, effects of humidity and composition, RP1237
- wet process, for cast iron, T246
- Endothermic and exothermic effects in glass, RP1734
- Energy, intrinsic, of gases, measurement, RP487
- levels of uranium, RP1729
- loss in elastic deformation, T365
- radiant, measured in absolute value, S261
- spectral distribution by Planck's equation, tables and graphs, M56
- Engesser's theory of column strength, T263
- Engine parts, automotive (bus), packaging, R161
- performance, effect of fuel distribution, RP1712
- tests, correcting for humidity, RP118
- tests of substitute motor fuels, RP1660, RP1673, RP1681
- tests with producer gas, RP1698
- Engines, Diesel and fuel-oil, CS102E
- Engineering materials, properties, C101
- Engler viscosimeter, T100
- Enthalpy of alcohol and benzene, RP312
- and entropy increases of synthetic rubber GR-S, RP1595
- saturated steam, RP209, RP210
- of water, RP209, RP210
- Entropy and enthalpy increases of synthetic rubber GR-S, RP1595
- of ethylbenzene, RP1684
- of monolefins, RP1738
- Envelopes, window, T343
- Enzymatic hydrolysis of citrus fruit peel, RP1617
- of disaccharides and glycosides, RP1369, RP1398
- of sucrose and inulin, RP1526
- Enzymes, action on starch, RP1599
- action on wool, RP1500
- hydrolysis of beet pulp by, RP1616
- Enzymes, resistance of wool to, RP1433
- Equations, finding roots, RP790
- Equilibria, phase (*see* phase equilibrium)
- Equilibria of isomerization of the 18 octanes, RP1641
- studies on portland cement at high temperatures, RP1699
- Equilibrium conditions in system carbon, iron oxide, and hydrogen, S350

- Equilibrium constants of butadiene reactions, RP1747
 of formation of alkylbenzene hydrocarbons, RP1732
 of formation of monoolefin hydrocarbons, RP1722
 of some reactions involving O_2 , H_2 , H_2O , C , CO , CO_2 , CH_4 , RP1634
- Equilibrium temperatures of glass, RP1637
- Equivalents, metric weights and measures, M135
 weights and measures, tables, C47, M121
- Erbium, spectrophotometric determination, RP-1456
- Eriometer, Young's, RP300
- Erythemic reaction to ultraviolet, RP433, RP631
- Etching, deep, of steel, T156
 methods for alloy steels and ferro-alloys, S518
 reagents for copper and nickel, S399, S435
- Ethane, determination by explosion methods, RP715
 determination by slow combustion, RP625
 heat of combustion, RP686
- Ethanol, determination of, in acetanilide, RP1600
- Ether, boiling point and relation to pressure, RP922
 insoluble rubber, RP719, RP720
- Ethyl alcohol, density and thermal expansion, S197
 thermodynamic properties, RP1747
 with gasolines, water tolerances, RP1059
- Ethylbenzene, isolation from petroleum, RP554
 heat of combustion, RP1629
 specific heat of vapor, RP1640
 thermodynamic properties, RP1684
 vibrational frequencies, RP1758
- Ethylcyclobutane, physical constants, RP375
- Ethylcyclohexane, heat of combustion, RP1783
 properties, RP817
- Ethylcyclopentane in petroleum, RP1800
- Ethylene, heat of combustion, RP1024
 heat of hydrogenation, RP933
 vibrational frequencies, RP1768
 chloride, boiling point and vapor pressure, RP1097
 glycol as quenching medium for steels, RP357
 oxide, analysis, RP1175
- 3-Ethylpentane, boiling point and vapor pressure, RP1865
- Euler's formula, for buckling of columns, T258
- Eutectic temperatures by a conductance method, RP57
- Eutectoid carbon steel, S404, S408
- Evaporation in testing sugars, S221
 of metals, method of producing mirrors, C389
 test for mineral oils, T13
- Excavating burs, dental, R195
- Excavators, dragline and clamshell (export classifications), CS90E
- Excitation data (color), interpolation, RP334
- Exhaustion by reciprocating air pump, rate of, T224
- Exits, building, design and construction, M151
- Expanded metal, tests of slabs reinforced with, T233
- Expansion effect on inversion of silica crystals, RP1153
 factor for gases, orifice meter, RP459
 iron, RP1597
 moisture, of ceramic whiteware, RP472
 moisture, of paper, RP1054
 phenomena, in steel during quenching, S513
 steam-turbine, S167
 tanks, R8
- Expansion, thermal (*see also* specific materials)
 alcohol, S197
 aluminum and its alloys, S497
 aluminum-beryllium alloys, S565
 antimony, RP784
 apparatus, S524
 autographic apparatus, RP722
 barium-strontium titanate, RP1776
 bearing bronzes, RP665
 beryllium, S565
 boric oxide, RP1425
 boric-oxide glass, RP1425
 brass, S321
 bronzes, RP1518, RP1550
 carbon, T335, RP693
 cast and swaged chromium, RP1407
 cast iron, S433
 chromium, electrolytic, RP1361
 chromium-vanadium steels, RP1269
 clay building bricks, RP1414
 clays, RP194, RP387, RP1243, RP1311
 columbium, RP590
 copper, S410
 copper alloys, RP1518, RP1550
 copper-beryllium alloys, RP890
 diamond, RP693
 duralumin, S497
 electrical insulating materials, S352, T216
 enamel frits, RP1172
 gasolines, RP393
 gasoline-benzol mixtures, M97
 glass, S393, RP626, RP667, RP1425, RP1734
 glassware, chemical, RP1394
 glazes, RP1064
 graphite, T335, RP693
 heat-resisting alloys, S570, RP388, RP1106
 high-silicon cast iron, RP1581
 indium, RP1541
 iron, S433, S570
 lead, RP500
 lead-antimony alloys, RP938
 magnesium and its alloys, RP29
 marble, S352
 measurements by interference, RP515, RP1227
 mica, RP1675
 molybdenum, S332, S488
 monel metal, S426
 motor fuels, RP393
 nickel, S426
 nickel-chromium alloys, RP388
 petroleum oils, T77, RP244
 petroleum products, M97
 porcelain, S352
 pyrex glass, RP626
 quartz, fused, S524
 refractories, RP114, RP562, RP747
 rubber, RP717, RP1253
 silica, fused, S524
 silicates, RP456
 stainless iron, S570
 stainless steel, S426
 steel, S433
 stellite, S426
 tantalum, RP62
 terra cotta, S485
 titanium, RP1520
 tungsten, S515
 tungsten carbide, cemented, RP960
 Vycor and silica glass, RP1445
 whiteware bodies, T310
 zirconia with oxide additions, RP1662
- Expansivity, liquid normal hydrogen and para-hydrogen, RP1023
- Explosion pressure indicators, RP1368
- Exposure machine, photographic (sensitometer), S511
 meter for radium, RP1246
 relation to photographic density, S439
 tests of plastic calking compounds, BMS33
- Exposures, photographic, intermittency effects, S528
- Extensometer calibration, RP822
- Extraction apparatus for low-boiling solvents, RP439
 for petroleum, RP311
- Extractors, commercial laundry, R139
- Extrusion machine augers, efficiencies, RP36
 for clay products, RP798
- Eye-protective glasses, ultra-violet and visible transmission, T119, T369, C421
 sensibility, S49, S303, S366, S475
- Eyes of industrial workers, safety code for protection of, H2, H24

F

- Fabric, automobile-tire, testing, T68
 fire-resistant airplane, RP788
 heat-transmission apparatus, T269
 measuring devices, M85
 tension meter for use on aircraft, T320
- Fabrics, air permeability, RP261
 air permeability instrument, RP1471
 aircraft, absorption of water, RP758
 balloon, permeability, T113
 device for determining coefficient of friction, RP1562
 dress, woven, testing and reporting, CS59
 elastic, woven, CS58
 evaluation of crease-resistant finishes, RP1077

- fastness of dyed, RP80
flexural fatigue, RP1485
friction coefficient, RP196
gas-cell, RP750
impregnated, for bookbinding, CS57
mohair pile, CS52
moist, chilling effect, RP1587
pliability, device for evaluating, RP1434
transmission of ultraviolet, RP6
water-repellent, RP1762
wool and part-wool, CS65
"Fibrihome" constructions, structural properties, BMS11
Fadeouts, radio, RP1016
Fading by laundering, T273
radio, S476, RP70, S561
radio, from broadcast antenna, RP874
Fading rate of paint, RP1478
recorders, synchronization of radio, RP269
Fahy permeameter, S306
simplex, RP174, RP845
Fans, propeller, RP193, RP283
Faraday chamber, collector for cathode rays, RP332
value, S218, S271, RP1189
Fastness, light, of lithographic inks, RP100
dyed fabrics, RP80
Fatigue of aircraft propellers, RP678, RP764
flexural, of textiles, RP1485
metals, influence of notches, RP725
properties of rail steels, T363, RP92, RP182
properties of wire, RP754
steels, influence of stress corrosion, RP1307
steels, testing of, T275, RP454
stressing, effect on steel, RP1733
Feathers, ultra-violet transmission, RP6
Fechner's law, S49
Federal Fire Council, manual of fire loss prevention, H19
Federal specifications, alphabetical index, C378
Feldspar, CS23
effect of particle size in whiteware, RP594
gases in, RP420
in whiteware bodies, RP1011
related to viscosity of porcelain bodies, T50
Feldspars, analysis of, RP180
Fellowships, research, at the Bureau of Standards, C296
Felt, asphalt-saturated, specifications, C161, C286
coal-tar saturated, specification, C156
products, asphalt- and tar-saturated; and asphalt roll roofing, R213
roofing, weathering, RP888
Felts, roofing, experimental production, RP67
Fences, electric, safety rules, H36
Fencing, woven-wire; and woven-wire fence packages, R9
Fermentation of starch hydrolysis products, RP1599
Ferric oxide, influence upon temperature of liquid formation in Portland cement mixtures, RP132
ternary system with calcium oxide and silica, RP1340
Ferrite, microstructure, S571
heats of solution, RP1805
Ferro-alloys, etching methods and solutions, S518
Ferrochromium, decarburization by hydrogen, S448
Ferronickel alloys, C100
Ferrotungsten, sampling, RP237
Fiber boards, BMS13
boxes, corrugated and solid, for canned fruits and vegetables, R146
boxes, corrugated (for department and specialty store use), R128
building boards, accelerated aging, BMS4, BMS69
building boards, properties, M132, BMS50
Caroá, as a papermaking material, T340
diameters by diffraction method, RP300
elongation of fired sagger clay bodies, RP387
insulating board, CS42
insulating board, experimental dry-wall construction with, BMS97
insulating board, structural, vegetable fiber, R179
insulating lath, suitability as plaster base, BMS3
sheathing boards, stability, as determined by accelerated aging, BMS69
sheet packing, specification, C335
test sheets, preparation, RP190
Fiber tile boards, properties and performance, BMS77
twines, hard, R92
wallboard, CS112
wood, permanence of purified, RP107
wool, structure, RP1412
Fiberboard, "Homasote", structural properties, BMS48
Fibers, autographic load-elongation apparatus, RP1546
bast, microscopic structure, RP1482
cordage, testing, RP1611
Fibers, cornstalk, separation, M148
flexural fatigue, RP1485
identification by microscopy, T250, C423
resembling fused quartz, S7
stained, for photomicrography, T217
used in wire rope, T121
wool, grading, RP300
Fibroin, silk, combination with acid and with base, RP1360
methylated, titration curve of, RP1360
Fibrous materials, heat flow in, RP243
Field, electric, of charged wire and surrounding conductor, S542
-intensity measurement, accuracy at broadcast frequencies, RP1156
intensity measurements, radio, from 285 to 5,400 kc/s, RP429
intensity records, radio, RP597
Files and rasps, R6
Files, Swiss pattern, R206
Fillers, paper, comparative study, T301
Film, motion-picture, for preservation of records, M158
motion-picture, stability determined by accelerated aging, RP950
photographic, dimensional changes, RP1051
photographic, for miniature copies of records, R165
photographic, preservation of records on, RP942, RP950, M144, M154, M158, M162
photographic, viscose type, stability, RP1134
Films, adhering liquid, thickness, RP1332
adsorbed, thickness, RP241
American photographic, characteristics, S439
on steels, rate of oxidation from interference colors, RP1221
surface, thickness, RP241
Filter, luminosity, use in physical photometer, RP1415
for obtaining light at wave length 560 m μ , RP785
paper, measurement of speed, RP1613
paper voltmeter S194, S195
papers, evaluation, RP1653
Filters, for producing color of equal-energy stimulus, RP652
light, M114
light, in photomicrography, T217
light, radiometric investigation, S168
monochromatic for Hg, He, and H lamps, T148
photographic, S409, S439
spectral, for measuring absorbancy in sugar solutions, RP878
Financing methods, present home, BH12
Fineness of cement determined by air analyzer, T48
grain of clays, T79
tests of molding sands, RP1720
Finger cots, rubber, specification, C226
Finishes, evaluation of crush-resistant, RP1047
for builders' hardware, standard, C275
for cast stone, CS53
Fire brick, creep and elastic behavior, RP1770
melting points, T10
porosity and volume changes, T159
tensile properties, RP923
Fire-clay bodies affected by size of grog, T104
brick, deformation, RP1030
brick, for coal-fired boiler settings, T279
brick manufacture, properties, uses, and specifications, C282
brick, panel spalling test, RP1630
brick, specifications, C298, C299
ladle sleeves, thermal expansion, RP1084
mortar, air-setting, dry type, RP1461
mortars, heat-setting, RP1534
refractories, plastic, specification, C297

- Fire clays, plastic, European, T79
properties at several temperatures, RP194
- Fire-extinguishers for dwellings, C397
extinguishing liquid, specification, C134
hazard, heating installations, RP596
hose, cotton rubber-lined, specifications, C114
hose coupling threads, H28 (1944)
hose, unlined linen, specification, C358
hose, couplings and fittings, C50, M61
loss prevention, Manual of Federal Fire Council, H19
protection, for dwellings, BMS107
resistance classifications of building constructions, BMS92
resistance, concrete columns, T272
resistance in buildings, recommended minimum requirements, BH14
resistance of hollow load-bearing wall tile, RP37
resistive materials, heat-insulating properties, T130
-retardant treatment of wood and fabrics, C397
tests, building columns, T184
tests, gypsum column protections, RP563
tests, wood partitions, RP1076
tests of wood- and metal-framed partitions, BMS71
tests, theatre proscenium curtains, RP603
- Firefly, light of, S132
Firing rings, veritas, T40
Fireproofing of aircraft fabric, RP788
First-aid unit dressings and treatments (packaging of), R178
Fits, comparison of national standards, T344
Fittings, cast-brass solder-joint, R212
clay sewer pipe, R211
diamond core drill, CS17
eaves trough, conductor pipe, and ridge rolls, R29
pipe, for warm-air heating and air conditioning, R207
pipe (gray cast iron, malleable iron, and brass or bronze), R185
solder-joint, cast-brass, R212
wrought-iron and wrought-steel pipe, R57
- Fixed points, thermometric, C66
Fixtures, plumbing, hospital, R106
plumbing, staple, porcelain (all clay), CS4
plumbing, staple vitreous china (included in Commercial Standard CS20-36), R52
- Flame propagation, velocity, RP900
standards in photometry, S222
structure, RP84
- Flameproofing of textiles, C455
Flannels, cotton canton, for work gloves, R186
Flares, liquid-burning, for vehicles, CS88
Flashes, visibility of incandescent and neon, RP78
Flashing, copper, corrosion, RP123
felt, asphalt-saturated, specification, C286
Flashings, metal, specification, C180
plastic, specification, C181
Flash-light batteries, (see Dry cells)
batteries, packaging of, R104
cases, metal and fiber, R68
Flashover, radio-frequency, measurement, S471
voltage of electrical insulating materials, T216
Flasks, Dewar, silvering and evacuating, RP885
Flatware, sterling silver, R54
Flax, New Zealand (phormium tenax), papermaking properties, RP285
Flax, microscopic structure, RP1482
packing, specification, C239, C363
twine, R136
Flexometer for cloth and similar materials, RP555
Flint, potter's, effect of particle size in whiteware, RP594
Flints, in white-ware, T310
Floor construction, ribbed, forms for concrete, R87
coverings, adhesives and priming coats, BMS59
coverings, dimensional changes with changes in relative humidity and temperature, BMS85
coverings, indentation and recovery, BMS14, BMS73
coverings, indentation characteristics, BMS73
coverings, performance tests, BMS68, BMS80
lights, R49
furnaces, oil-burning, CS113
polishes, C383, C424
structures, transmission of sound, RP48
sweeps, R88
- Flooring, magnesia cement, specification, C323
materials, wear resistance, RP612
oak, CS56
Floors, concrete, wear tests, RP1252
forms for concrete joist construction, R87
light-weight steel, RP463
Floors, measurements of heat losses from, BMS103
scouring powders, specification, C370
slabs, tile and concrete, tests, T220, T236, T291, RP181
slipperiness, BMS100
sound insulation, BMS17 and Supplement
steel, strength, RP662
structural and heat-transfer properties of "Multiple Box-Girder Plywood Panels" for, BMS99
structural properties, BMS9, BMS10, BMS12, BMS15, BMS16, BMS18, BMS20, BMS46, BMS51, BMS62, BMS90, BMS99
structural properties of "PHC" prefabricated wood-frame constructions for, BMS90
wood-frame, structural properties, BMS25, BMS36, BMS37, BMS47
- Flow of air, measurement, RP49
calorimeter, S503
laminar, of two liquids, RP1591
manostat, T1492
meters for air, T183
plastic, laws, S278
plastic materials through dies, device for studying, RP36
steels at elevated temperatures, T296, RP192
Flow, turbulent, in channels, RP1151
of water in open channels, RP1488
Flow-point pressure of plastic clay, RP1186
Flue gas temperature, effect of soot, BMS54
Fluid milk cans, R208
Fluidities of celluloses in different solvents, RP1441
Fluidity measurements, equipment to dissolve cellulose, RP1442
Fluor derivatives of carbohydrates, RP287
Fluorating process, RP287
Fluorescent color samples, measurement, RP1700
materials, photometer for measuring, RP1646
Fluorine, determination, RP1406
determination in glasses and enamels, RP110
separation from aluminum, RP86
Fluorite, infra-red spectral transmission of colored, S191
refractive indices, S401
spectroradiometers, S401
2-Fluoropentane, boiling point, optical rotation, and refractive index, RP1551
Fluorspar, analysis, RP51
Focal length of converging lens, S110
Fog-landing aids for aircraft, RP602, RP1006
Folding tester, Schopper, paper, calibration and adjustment, T357, C379
Food containers, paper, R175
dyes, spectral transmission, S440
service equipment, R182
Food trays, or dishes (waxed paper, molded wood pulp, and wood types), R187
Forced-air furnaces, solid-fuel-burning, CS109
Forged axes, R158
hammers, R159
hand tools, R17
hatchets, R160
light hammers, R159
Fork, tuning, calibration, RP144
Formates of metals, properties, RP587
Formic acid, dissociation constant, RP1537
Forming methods, effects on ceramic white-ware, RP1371
Forms, bank (checks, notes, drafts, and similar instruments), R50
commercial, invoice, inquiry, and purchase order, R37
for concrete joist floor construction, R87
warehouse, R34
Formula of a hydrocarbon, determination, RP236
Foundation walls, structural properties, BMS26
Foundry molding sands fineness test, RP757
patterns of wood, CS19
refractories, malleable, R79
Fountain syringes, specifications, C250, C251
Fourdrinier wire cloth, CS36
Fourier, analysis of alternating current waves, S203
Fractionating column with fritted glass plates, RP651

Fractionation of cellulose acetate, RP1490, RP1654
 isotopic, of water, RP601
 of light-oil, T140
 of petroleum, *see* petroleum fractionation
 Frame, rigid, stresses, RP1130, RP1161, RP1224, RP1431
 wall construction, accumulation of moisture in, BMS93
 "Frameless Steel" constructions, structural properties, BMS9
 Frames and trim, for hollow metal doors, R82
 for kalamein doors, R83
 concrete, effect of brackets, RP9
 Free energies and equilibria of isomerization of the butanes, pentanes, hexanes, and heptanes, RP1440
 of formation of alkybenzene hydrocarbons, RP1732
 of formation of monoolefin hydrocarbons, RP1722
 of formation of paraffin hydrocarbons, RP1650
 of isomerization of the 13 octanes, RP1641
 of some reactions involving O_2 , H_2O , C, CO, CO_2 , CH_4 , RP1634
 Free energy function for monoolefins, RP1738
 Freezing, fractional, purification of substances by, RP1588
 and melting curves, theoretical analysis, RP1585
 and thawing of bricks, BMS60
 and thawing tests of cast stone, RP389
 and thawing of sand-lime brick, RP1065
 curves of hydrocarbons, RP1397
 of water, RP1105
 Freezing point, *see also* Melting point
 determination of purity of hydrocarbons by measurement of, RP1676
 deuterium, RP841
 gallium, RP735
 of hydrocarbons, RP1734, RP1752, RP1760
 of iridium, RP568
 of iron, RP1375
 method for determining individual hydrocarbons in mixtures of hydrocarbons, RP1584
 nickel, RP258
 purification, purity and freezing points of 8 nonanes, 11 alkylcyclopentanes, 6 alkylcyclohexanes, and 4 butylbenzenes of the American Petroleum Institute-Standard and American Petroleum Institute-National Bureau of Standards series, RP1760
 rhodium, RP676
 Freezing range as a criterion of purity, RP1351
 temperature of benzoic acid, RP1647
 temperature of silver, RP557
 Frequencies from 5 to 200 cycles per second, measurement, RP195
 Frequency, generator of audio with piezo-electric stabilization, S569
 graphs, maximum usable, application to communication problems, RP1167
 method of standardization by harmonic amplifier, S530
 measurement, radio-frequencies, RP220, C74
 Frequency modulation demodulator, synchronized oscillator as a, RP1780
 monitoring, radio, RP766
 radio, standards, RP759
 standard, transmitting sets, RP630
 standards for broadcasting stations, RP135
 ultra-radio, standardization by means of parallel wires, S491
 Fresnel reflection, diffusely incident light, RP1504
 Friction of ball and roller bearings, T201
 coefficient of fabrics, RP196
 determination of coefficient for brake lining, RP1297
 journal bearings, RP1295
 meter for fabrics, RP1562
 tape, rubber, specification, C229
 Frictional coefficients of walkway materials, RP204
 properties of rubber, RP1463
 Frits, enamel, consistency, RP1063
 thermal expansion, RP1172
 Frost action on bricks, RP1349
 Fructose derivatives, RP287
 preparation of, S519
 Fruit and vegetable cans, R155

Fruits, canned, corrugated and solid fiber boxes for, R146
 Fucose, preparation, S459
 Fuel-air mixtures, dew points, S500
 consumption of automobiles, effect of tire resistance, T283
 distribution, effect on engine performance, RP1712
 oil and Diesel engines, CS102E
 oils, domestic and industrial, CS12
 oils, heat of combustion, M97
 rating, effect of altitude, RP1475
 Fuels, liquified or "bottled" gas, C420
 hydrocarbon liquid, thermodynamics of reactions for producing, RP1634
 motor, substitute, RP1660, RP1673, RP1681, RP1698
 motor, volatility, RP694
 Fumigation of paper, RP828
 Function, approximation from a set of mean values, and instantaneous value, RP1235
 Fungicides, package sizes, R41
 Fur cleaning, T360
 Furfural, formation from pentoses, RP1233
 losses due to nitrates, RP398
 mechanisms of formation from pentoses, galacturonic acid, and ascorbic acid, RP1594
 quantitative formation from pentose compounds, RP1132
 reaction of bromine, RP1276
 Furnace, electric, temperature uniformity in, S219
 for X-ray diffraction at elevated temperatures, RP1782
 high temperature, with special oxide resistors, RP1443
 modified Rosenhain, S348
 Furnaces, domestic, fire hazard, RP596
 forced-air, solid-fuel-burning, CS109
 gas floor, CS99
 oil-burning, floor, CS113
 solid-fuel-burning, forced-air, CS109
 warm-air, equipped with vaporizing pot-type oil burners, CS(E)104
 Furniture, school, color, R111
 Fuse, radio proximity, design, RP1723
 Fuselage, design of compression members, RP698
 Fuses, cartridge-inclosed, T74
 Fusible alloys, RP248, C388
 tin boiler plugs, T53, RP129

G

Gadolinium, spectrum, S466
 Gage, all glass or quartz, for measuring pressures developed by corrosive materials, RP1622
 blanks, CS8
 blanks, plain and threaded plug and ring, M100
 blocks, testing and standardizing, S436
 lines, determination of stresses from strain measurements on, RP851
 optical coincidence, RP272
 piston, RP324
 standard, for sheet and plate iron and steel, C18
 strain, for large strains, RP1658
 Gages, apparatus for comparison of length, RP528
 screw, M61, M141
 screw micrometer, for rubber specimens, RP549
 screw thread, H28 (1944)
 sheet metal, C391
 standard designs, M89, M100
 strain, compensation for vibration and impact, RP1005
 wear resistance of, RP276
 wire, table of sizes, C67
 Galactose, occurrence in collagen, RP1432
 preparation, S416
 thermal mutarotation, RP892
 Galacturonic acid, oxidation with oxygen in alkaline solution, RP1680
 preparation from beet pulp and pectic substances, RP1594
 preparation, mutarotation and structure, RP1547, RP1576
 preparation from sodium strontium galacturonate, RP1617
 salts of, RP1576
 d-Galacturonic acid, preparation, RP1325

Galacturonates, preparation from beet pulp, RP1616
 preparation from citrus fruit residues, RP1617
 Galena, photoelectric properties, S344
 ultra-violet reflecting power, S493
 Gallic acid in ink, RP807
 Gallium, atomic weight, RP838
 determination in aluminum, RP853
 freezing point, RP735
 photoelectric properties, S322
 purification, RP734, RP823
 Gallonage tables for tanks, C416
 Galvanized and japanned ware, R55
 steel and iron, corrosion tests, RP10
 steel, painting, BMS102
 ware, R55, R226
 Galvanizing iron and steel, C80
 Galvanometer lag, S185, S282
 mirrors, S229
 sensitivity as a function of resistance, RP150
 Galvanometers, critically damped, S273
 for radiometry, S85, S188, S204, S229, S244, S282
 moving-coil, S173, S297
 vibration, S134, S370
 Gamma radiation from radium, measurement, RP1283
 rays, internal absorption, in radium-beryllium neutron sources, RP1257
 Gamma-ray ionization chamber, RP641
 Garment-boxes, folding, stock, R172
 Garnet and hydrogarnet, hydrothermal synthesis, RP1355
 Garnet-hydrogarnet series, relationship to the sulfate resistance of portland cements, RP1411
 Gas adsorption on carbon adsorbents, RP1496
 Gas Analysis, S267, S316, T20, T34, T41, T89, T94, T131, T249, C48, RP75, RP266, RP962, RP1372, RP1380, RP1381, RP1382, RP1396
 apparatus, RP1214
 burette, S559
 by fractional distillation, RP1372
 control stopcock, RP130
 determination of ethane by explosion, RP715
 determination of ethane by slow combustion, RP625
 errors in, RP661, RP680, RP1112, RP1113
 gravimetric, RP1381
 pipette for difficult absorptions, RP177
 volumetric, RP962, RP1113
 Gas-appliance attachments, cautions regarding use, C404
 accidents from, T303
 effect of altitude on limits of safe operation, RP553
 testing to determine safety, T304
 Gas burner design, T193, C394, RP446
 burners, carbon monoxide from, T212
 burners, effect of depth of ports, RP988
 burners, method of testing, T222
 Gas calorimeter tables, C65, C417
 calorimeter, Thomas recording, RP519
 calorimeters, directions for operating, C48
 calorimetry, T36, S503
 compressibility, RP170
 cylinder valve threads, H28 (1944)
 cylinders for anesthetic gas (color marking), R176
 definition of ideal, S136
 density, T89, T94
 detector, S334
 efficiency of utilization, T222
 flame velocity measurements, RP900
 floor furnaces, CS99
 hose, specification, C290
 interferometer calibration, S316
 jets of, contraction coefficients, RP303
 laboratory wet test meters, saturation and tilting errors, RP1238
 lamps, T99
 measurement of large volumes, RP835
 measuring by cubic-foot standards, T114
 meters, testing large capacity, RP1741
 natural, analysis, RP1759, RP1789
 natural, economical use in home, C116
 producer, engine tests with, RP1698
 relation of heating value to usefulness, T290
 service standards, C32, C405

standard sample, analysis, RP1704
 testing, standard methods, C48
 thermometers, S57
 thermometer, used in establishing temperature scale between 14° and 83° K, RP1188
 tubing, flexible, T133
 volumetric measurements, RP908
 Gas-cell fabrics, effect of protective coatings on moisture absorption, RP818
 Gaseous fuels, knock ratings, RP1673
 Gases, critical constants, S541
 dehydrating agents for drying, RP1603
 efflux through small orifices, S359
 expansion factor, RP459
 gravimetric determination, RP1381
 heat capacities and P-V-T-data, RP1804
 in iron and steel, S346, S457, T118, T126
 in metals, determination by vacuum fusion, S514, S563
 in metals, hydrogen-antimony-tin method for oxygen in cast irons, RP25
 intrinsic energy, as function of pressure, RP487, RP503
 liquefied or "bottled", C420
 mixed, spectra, S4
 natural, separation of, RP75
 noble, spectra, RP710
 normal densities, S529
 permeability of rubber, S387
 rare, mass spectrometer study, RP1799
 relation between temperatures, pressures, and densities, C279, M71
 removal of dissolved, from liquid by vacuum sublimation, RP87
 separation and purification by distillation, RP1372
 slopes of 0° C isotherms, RP1393
 specific gravity, determined by a balance, T89
 specific heat of, S503
 test for purity, RP643
 twin-bomb method for P-V-T data, RP470
 volumes and pressures, RP1493
 Gas-lighting conditions in 10 cities, T99
 Gas-mantle lamps, efficiency, T110
 Gas-measuring instruments, C309
 impurities, effect on properties of cast red brass, RP1553
 Gaskets, asbestos metallic cloth, specification, C242
 metallic-incased, specification, C336
 rubber, specification, C235
 Gasoline, critical solution temperatures of mixtures with ethyl alcohol and water, RP560, RP571
 engine tests of substitute, RP1660, RP1673, RP1681
 flow meters (aircraft), T237
 fraction, hydrocarbons in, RP1571
 gauges (aircraft), T237
 heats of vaporization, RP825
 measuring pumps, testing and inspection, T81
 natural, RP75
 reclamation of, dry-cleaning, T280
 thermal expansion of, RP393
 viscosity, T125
 with alcohol, water tolerances, RP1059, RP1060
 Gasoline-air mixtures, dew points of, S500
 Gasoline-benzol mixtures, thermal expansion and heat of combustion of, M97
 Gasolines, volatility, RP694
 Gasometric method for analysis of mixtures of ethylene oxide and carbon dioxide, RP-1175
 Gathmann ingots, properties of rails from, T363
 Gauze, surgical, R86
 Geiger counter, RP165, RP167, RP191, RP419, RP509
 determination of radium content, RP1792
 Geiger-Müller counter, RP526, RP1330, RP1627
 aluminum-tube, RP1666
 counter, portable, RP1154
 for cosmic-ray observations in stratosphere, RP1254
 for determination of radioactive contamination, RP1223
 hypodermic needle type, RP1525
 interval selector for studying distribution of pulses from, RP1509
 measurement of beta rays, RP1731

Gelatin as a suppressor of maxima in polarographic waves, RP1631
 infra-red spectral transmission, S168
 Gel rubber hydrocarbon, RP719, RP720
 General Shale Products Corporation, structural, heat-transfer, and water-permeability properties of "Speedbrik" wall construction sponsored by, BMS86
 Generator, audio-frequency, RP367
 constant-frequency, clock-controlled, RP406
 piezo-electric, for audio-frequencies, RP40
 set, 5,000-volt, S25
 Generators, electron tube, S355
 surge-current, RP929
 Geodetic tapes, C2, C328
 Germanium spectrum, RP1266
 Germicide, hypochlorite, liquid, CS68
 Gibbsite, occurrence in the system $\text{CaO-Al}_2\text{O}_3\text{-H}_2\text{O}$, RP1539
 Gilsonite, electrical and mechanical properties, RP1554
 Girder hook tests, T260
 Girders, aircraft, determination of cross-sectional areas, RP1258
 Glass, annealing and characteristics, S358
 antiscatter treatment, M175
 boric oxide, thermal expansion, RP1425
 chemical, durability, RP1409
 cause and removal of heterogeneities, S572
 composition and density, RP507, RP1197
 composition and specific refraction, RP1352
 composition related to refractivity, density and thermal expansion, RP762
 containers for cottage cheese and sour cream, R148
 containers for maraschino cherries, R197
 containers for mayonnaise and kindred products, R131
 containers for olives, R196
 containers for preserves, etc., R91
 content of portland cement clinker, RP997, RP1324, RP1358
 content of portland cement: effect upon heat of hydration, RP1127
 determination of boron in, RP882
 devitrified by heat treatment, RP1152, RP1153
 dilation at high temperatures, S393
 dimensional changes caused by heating cycles, RP219
 disk for 70-inch telescope reflector, RP97
 durability and hygroscopicity, RP1706, RP-1719
 effect on electromotive force of standard cells, RP588
 electrode, asymmetry potential and chemical durability, RP1400
 electrode circuit, RP634
 electrodes, use, RP1495
 electrodes, voltage departures and solubility, RP1187
 expansivity, RP626
 expansion and viscosity of, RP1734
 gases in, RP1014
 glazing, specification, C164
 heating curves, RP292
 index of refraction, RP1575
 insulation of thermometers, electrical conduction in, RP1466
 joints, interchangeable ground, CS21
 methods for silvering, C389
 mirrors, plate, CS27
 optical, annealing and heat treatment, S572
 optical, attack on refractory clay pots, RP1689
 optical, refractive index, RP1572, RP1575
 optical, striae in, S333, S373
 optical, surface tensions, RP1771
 in portland cement clinker, estimation, RP1805
 pot, casting of, C452
 pots, S485, T79, T104, T144
 prevention of stones, RP71
 refraction at high temperatures, S521
 refractivity and density changes caused by annealing, RP1793
 relaxation of stresses in, RP1637
 stopcocks, C430
 tank refractories, experimental, RP44
 thermal expansion, RP667
 transmission changes by ultraviolet radiation, RP744
 tubes, bursting pressures, RP1521
 tumblers, flint-lime, specifications, C119
 viscosity of optical, RP577
 volumetric apparatus, testing, S92, C9, C434
 Vycor and silica, expansion, RP1445
 X-ray protective properties, RP870
 Glasses, colored, ultraviolet and visible transmission, T148
 determination of fluorine and silica in, RP110
 eye-protective, T93, T119, T369, C421
 fluorocrown, index of refraction and dispersion, RP1659
 Lovibond, S547, RP31
 pH response and hygroscopicity of, RP1706, RP1719
 potash-silica, electrode function, RP1743
 railroad signals, color specification, RP1688
 soda-lime-silica, index of refraction, RP316
 solarized ultraviolet transmitting, RP345
 sun, blown, drawn, and dropped lenses, CS79
 sun, ground and polished lenses, CS78
 Glassine bags, R107
 Glassware, chemical, properties, RP1394
 chemical, tests of, T107
 Glaze fit on ceramic bodies, RP189
 Glazes and ceramic bodies, strains between, RP189
 high-fire porcelain, for spark plugs, T196
 lead borosilicate, RP1064
 leadless boro-silicate, T31
 low cost, for structural clay products, C436
 moisture expansion of ceramic, RP288
 solubility of colored, RP1196
 Globe-Wernicke Co.'s "Scot-Bilt" sheet-steel constructions for walls, floors, and roofs, structural properties, BMS46
 Gloss measurement, RP879, RP958, RP1345
 Glossary of housing terms, BMS91
 paint terms, BMS105
 Glossmeter, for measuring surface smoothness, RP1708
 Glove cleaning, T360
 Gloves, latex, surgeons', CS41
 rubber, specifications, C271
 rubber, surgeons', CS40
 rubber, surgeons', specification, C217
 work, CS139
 work, cotton canton flannels for, R186
 work, cotton jersey cloth and tubing for, R194
 Glower, Nernst, S91
 d - α -Glucoseptidoses, enzymatic hydrolysis, RP-1369
 Gluconic acid formed by oxidation of glucose with chlorites, RP1408
 Glucose, occurrence in collagen, RP1438
 oxidation, RP82, RP534
 β -Glucosidase, hydrolysis of disaccharides and halogenosalicin compounds with, RP1398
 Glucosides, rotation, RP1601
 Glucosido-mannose, derivatives, RP392
 Glue, use in paper coating, T323
 Glycerine as quenching media for steels, RP357
 Glycerine, infra-red spectral transmission, S418
 Glycosides, action of almond emulsin, RP1369
 of d - α -Guloheptopyranose and of neolactose, RP1429
 preparation and optical rotations, RP1399
 Goggles, H2, H24
 Gold alloys, dental, RP32
 articles, karat, marking, CS67
 dental alloys, analysis, S532
 determination of small amounts, RP1694
 determination of thickness of electrodeposited coating of, RP1694
 effect on determination of iridium, S483
 leaf radiometers, S322
 precipitation by sodium nitrite, RP1103
 spectrum, S411
 Gold-chromium resistance alloys, RP737
 resistance coils, RP1206
 Gold-cobalt alloys, resistance and thermoelectric properties, RP789
 Gold-filled and rolled-gold-plate articles, marking, CS47
 Golf shafts, hickory, CS18
 Goring, elastic shoe, R112
 Goutal method for determining carbon monoxide and carbon dioxide in steels, T126
 GR-S synthetic rubber, specific heat and increases of entropy and enthalpy, RP1595
 Grade terminology, M173
 Grading of diamond powder, CS123
 Graduates, glass, C9, C61, C434

Grain, abrasive; sizes of, R118
 hopper scales, manufacture, installation and performance requirements, C199
 size, austenite, RP1225
 size, austenitic, of carbon steels and iron-carbon alloy, influence of initial structure and rate of heating, RP1481
 size, austenitic, and critical cooling rate of iron-carbon alloys, RP1308
 size, effect on toughness of forging steel, RP1410
 size of annealed carbon steels, S397
 Granite curbstone, R102
 permeability of, T305
 properties of, RP1320
 Graphite crucibles, bond clays for, T79
 crucibles from American bond clays, T144
 heat of combustion, RP1139, RP1140, RP1620
 reflecting power, S152
 thermal expansion, T335, RP693
 thermodynamic properties, RP1634, RP1747
 ultra-violet reflecting power, S493
 Graphitization of white cast iron, T129
 Grating, stigmatic concave mounting, S441
 Gravel aggregates, coarse, R163
 specification, for built-up roofing, C158
 Gravimetric determination of gases, RP1381
 Ir, Pd, Rh, Pt, RP655
 Gravitation, constant of, RP256, RP1480
 Gravitational anisotropy in crystals, S482
 Gravity, absolute determination, RP1502
 Gravity, absolute value at Washington, RP946
 Gray absolute electrodynamic meter, S27, S28
 sensation, spectral distribution for, S417
 Grease-measuring devices, specifications and tolerances, M85
 Greases, consistency of, RP188
 Green paint, specifications, C97
 Grid modulation, radiotelephony, S423
 Grinding, effects on surface hardness of 0.33 percent carbon steel, RP1374
 wheels, R45
 wheels, dental lathe, R130
 Grocers' bags, paper, R42
 Grog in fire-clay bodies, T104
 Ground connections for electrical systems, T108
 Ground-glass joints, stopcocks, and stoppers, CS21
 test for waterproof paper, T312
 Grounding of electrical circuits and equipment, T108, C49, H3, H4, H6, H7, H31, H32, H39, M95
 rules, Discussion of National Electrical Safety Code, H39
 Ground-speed indicators, aircraft, T237
 Grounds, for lightning protection, T56
 Guayule rubber, T353
 Guide-chart for carbon-brush terminals (electric), M180
 Guloheptonic γ -lactone and phenylhydrazide, preparation and properties, RP1052
d- α -Guloheptose, derivatives of, RP1429
 Guloheptoses, bromine oxidation, RP1069
 Gulose, optical rotation, RP128, RP226
 pentaacetate preparation and properties, RP1663
 Gulosides, crystalline, RP396
 optical rotation, RP128
 Gunite-faced walls, water permeability and weathering resistance, BMS94
 Gutta-percha, effect of pressure on electrical properties, RP806
 electrical properties, T299, RP213
 Gutters, roof, RP644
 Gypsum, calcined, specification, C206
 effect on decomposition of tricalcium silicate, RP381
 fire resistance, T130
 fire protections for columns, RP563
 plaster, C151
 plaster board, specification, C210
 plaster, specification, C205
 products, manufacture, C281
 properties and uses, C108
 wall board, specification, C211

H

Hack-saw blades, R90
 Haemacytometers, S507
 Haemacytometer testing, micrometer device for, RP1019

Hafnium, spectra, RP8, RP139, RP732
 Hairsprings for watches, elinvar and steel, RP670
 Half-cells, calomel, temperature and hysteresis errors, RP1018
 Half-silvered mirrors, C389
 Halide salts, spectrophoto-electrical sensitivity, S456
 1-Halogeno-2-methylbutanes, optical rotation and atomic dimension, RP978
 2-Halogenopentanes, optical rotation and atomic dimension, RP1551
 Halogenosalicins, enzymatic hydrolysis, RP1398
 Halogenated hydrocarbons, spectrophotometric detection of impurities, RP1643
 Hammers, forged, R159
 Hampson liquefier, S123
 Handles, ash, R76
 hickory, R77
 Hannay method for alkali cyanide, RP384
 Hardenability of high-purity iron-carbon alloys, influence of austenitic grain size, RP1308
 of iron-carbon alloys and carbon steels, RP837, RP1092, RP1225
 Hardening, secondary, of high-speed steel, S395
 Hardened steel cylinders, stresses in, S513
 tool steels, S513
 Hardness, Brinell, RP903
 Brinell and Rockwell compared, T334, RP185
 Brinell and scleroscope, related to grain size of steels, S397
 measurements, T11, RP1220
 of carbon and alloy steels, effect of lathe cutting conditions, RP516
 of single crystals of copper, RP742
 of surface layers of steel, RP1374, RP1484
 red, of high-speed steel, S395
 Hardware, builders' (nontemplate), CS22, R18
 builders' template, CS9
 cloth, commercial standard, CS132
 specifications, builders', C275
 Hardwood dimension lumber, CS60
 plywood, CS35
 Harmonic amplifier, use in radio-frequency standardization, S530
 analysis of waves, S203
 Harmonics, effect of phase upon acoustic quality, S127
 use in frequency measurements, RP220
 Harnes leather, physical properties, T160
 Harnischfeger Corporation's "Pre-Fab" constructions, structural properties, BMS18
 Hartman-Lüder lines, T327
 Hartmann test for lenses, S311, S494
 Hatchets, forged, R160
 Hazards, fire, gas, electrical, etc., in the home, C397, C463
 from static electricity, C438
 Headlights on motor vehicles, C276, M68
 Heads and eyes of industrial workers, safety code, H2
 die, self-opening and adjustable; chasers for, R51
 eyes, and respiratory organs, safety code, H24
 Heat capacities in aqueous solutions, RP151, RP331
 capacity of aluminum oxide, RP1797
 capacity of a two-phase system, with applications to vapor corrections in calorimetry, RP1693
 capacity of gases, RP1804
 capacity of monolefins, RP1738
 capacity of rubber, RP844
 capacity of synthetic rubber Hycar O. R., RP1487
 conduction theory, RP178
 content of alcohol and benzene, RP312
 content of aqueous solutions of the chlorides, nitrates, and hydroxides of hydrogen, lithium, sodium, and potassium, RP305
 content of petroleum products, M97
 content of water, RP209, RP210
 dissipated by automobile tires, T213
 flow in fibrous materials, RP243
 insulating properties of fire-resistive materials, T130
 insulation, metal-enclosed, RP207
 insulation of blankets, effect of laundering, T347
 insulation, textiles, T266
 loss, due to air infiltration, BMS45
 loss through building walls, RP291

- Heat of combustion, S230
 of benzoic acid, RP1499, RP1620, RP1711
 and formation of isobutane, RP833
 and formation of hydrocarbons, RP1629,
 RP1642, RP1702, RP1714, RP1715,
 RP1722, RP1728
 and isomerization of alkylbenzenes, RP1665
 and isomerization of the eight C_8H_{18} alkylcyclohexanes, RP1783
 and solution of styrene and polystyrene, RP-1801
 anthracite cokes and artificial and natural graphites, RP1139, RP1140, RP1141
 carbon monoxide, RP260, RP343
 ethane, propane, normal butane, normal pentane, RP686
 ethylene and propylene, RP1024
 hydrogen, RP259
 isoprene, RP1093
 methane, RP260, RP343
 normal olefin hydrocarbons, RP1028
 normal paraffin hydrocarbons, RP966, RP1607
 organic compounds, RP41
 petroleum oils, M97
- Heats of formation of alkylbenzene hydrocarbons, RP1732
 of carbon dioxide, RP1619, RP1620
 of deuterium oxide (heavy water), RP1287
 of hydrogen chloride, RP499
 hydrogenation, and combustion of the mono-olefin hydrocarbons through the hexenes, and of the higher 1-alkenes, in the gaseous state at 25° C, RP1702
 of paraffin hydrocarbons, RP1642
 of sulphur dioxide, RP111
 of water, RP259, RP343
 of water and carbon monoxide, RP1192
 and combustion of 1,3-butadiene and styrene, RP1628
 of the normal alkylcyclopentanes and cyclohexanes and the increment per CH_2 group for several homologous series of hydrocarbons, RP1728
- Heat of fusion of ice, RP1260
 of hydrogenation of ethylene, RP933
 of ionization of water, RP309
 of isomerization of 18 octanes, RP1635, RP1642
 of polymerization of styrene, RP1801
 of transformation of quartz, S557
 of vaporization and specific heat of alcohol, RP312
 of vaporization of benzene, RP312
 of vaporization of butene, RP1592
 of vaporization and fusion of 1,3-butadiene, RP1661
 of vaporization and fusion of ethylbenzene, RP1684
 of vaporization of gasoline, RP825
 of vaporization of nitrous oxide, RP1644
 of vaporization of water, RP209, RP210
 of vaporization of petroleum oils, M97
- Heat, specific, of petroleum products, M97
 transfer, (thermal insulation of buildings), C376
 transfer through building walls, RP291
 transfer through metal-inclosed insulation, RP207
 transmission apparatus, textile fabrics, specifications, T269
 transmission of textiles, RP1055
- Heat treatment, effect of, on magnetic properties of iron carbon alloys, S463
 effect on toughness of forging steels, RP1410
 of aluminum alloy sheet, RP1378
 of cement clinker, RP1358
 (or firing) of clay products, RP88
 of optical glass, S572
 of Pyrex glass, RP626
- Heat-content function for monoolefins, RP1738
 Heat-resisting alloys, thermal expansion, RP387
 Heat-transfer properties, BMS103
 of "Multiple Box-Girder Plywood Panels" for walls, floors, and roofs, BMS99
 of "Speedbrik" wall construction, BMS86
- Heaters, space, oil-burning, CS101
 Heating and cooling, effect on permeability of masonry walls, BMS41
 curves of glass, variations caused in, by heat treatment, RP292
- devices, temperature distribution in a test bungalow, BMS108
 effect of rate, on grain size of steel, RP1322
 installations, fire hazard, RP596
 rate and initial structure of carbon steels and iron-carbon alloy, influence on austenitic grain size, RP1481
 rates, effects on ceramic whiteware, RP1371
 solar, of various surfaces, BMS64
 value of gas, relation to usefulness, T290
 value of petroleum oils, M97
- Heating-boiler, effect of soot upon performance, BMS54
 Heats of hydration and transition of calcium sulfate, RP1107
 of isomerization of the five hexanes, RP1420
 of isomerization of the nine heptanes, RP1439
- Heavyside layer, influence on radio transmission, S476
 Heavy water in standard cells, RP1435
 solubility of $CdSO_4$ in, RP1707
- Heavy-water isotopes, RP820
 Hectograph pads, manufacture, C481
 ribbons, specification, C187
- Hefner lamp, S227
 Helices, mutual inductance, RP1178
 Helium, analysis by mass spectrometer, RP1664
 analysis by thermal conductivity method, T249
 bibliography, C81
 and caesium recombination spectra, RP46
 gas, luminous properties of electrically conducting, S89, S176
 infrared spectrum, RP781
 spectrum, S146, S191, S302, RP462
 spectrum, interference measurements, RP710
- Helix angles, chart for, M109
 Hemimellitene, from petroleum, RP614
 Hemp, microscopic structure, RP1482
 twine, R136
- Heptane, normal, boiling points and vapor pressures, RP1097, RP1280
 normal, from petroleum, RP432
 normal, properties, RP1160
- Heptanes, free energies and equilibria of isomerization, RP1440
 heats of isomerization, RP1439
 purification, purity, and freezing points, RP-1752
- Heptoses, acetates of, RP1663
 nomenclature of, RP1052
- Heterochromatic photometry, S238
 "average eye" for, S299
- Heusler magnetic alloys, S38
 Hevea rubber, optical and dimensional changes during freezing and melting, RP1129
- Hexacalcium aluminate hydrate, analogy to hydrated calcium silicoaluminates and hydrated calcium sulfoaluminates, RP-1623
- Hexanes, free energies and equilibria of isomerization, RP1440
 from petroleum, RP239, RP311, RP375, RP-383
 heats of isomerization, RP1420
- Hexoses, optical rotations of carbon atoms, RP128
 Hickory golf shafts, CS18
 Hickory handles, R77
- Hide, adsorption of water vapor, RP1763
 Hiding power of paint, T306
- High spark frequency in radio telegraphy, S96
 speed steel, heat treatment, S395
 speed steel, lathe tests, T228
- High-frequency ammeters, S206
 circuits, coupled, S158, C74
 circuits, energy losses, S190, C74
 electrical oscillations, S60, S95
 resistance and inductance, S509, T298
- High-purity iron, properties, RP1472
 High-temperature X-ray diffraction apparatus, RP1782
- High-silicon cast iron, thermal expansion, RP1581
 Hinges, specifications, C275
- Hole sizes for bobbins for filling cop winders, R152
 for taper tubes for filling cop winders, R153
- Hollow building tile, T120
 tile and concrete floor slab, test, T220, T236
- Hollow-tile walls, strength of, T238
 Holmium, spectrophotometric determination. RP-1456

- Homasote Co.'s insulating fiberboard, structural properties of wood-frame constructions, BMS48
- "Precision-Built, Jr." wood-frame wall construction, BMS72
- structural properties of "Precision Built, Jr." (second construction) prefabricated wood-frame wall construction sponsored by, BMS89
- Home canning, jar rings, their testing and a proposed specification, M181
- financing methods, BH12
- how to own your own, BH4, BH17
- safety, C75, C397, C463
- Homes, prefabricated, CS125
- Honey, extracted, containers, R156
- solubility of sugars in, T259
- Hooks, girder, T260
- Hopper scales, hand operated, C199
- Horsepower, relation to kilowatt, C34
- Hose couplings, C50, M42, M61, M141
- coupling threads, H28 (1944)
- divers', specification, C289
- fire, cotton rubber-lined, specification, C114
- garden, C327
- gas, specification, C290
- oil suction and discharge, specification, C209
- pneumatic, specification, C307
- rubber-metal gasoline, specification, C269
- steam, specification, C268
- tender (corrugated), specification, C288
- threads, M141, H28
- unlined linen fire, specification, C358
- water-suction (smooth bore), specification, C292
- water and wash deck, specification, C291
- Hosiery boxes, T253, C169
- length standards, T324
- lengths and sizes, CS46
- performance factors, RP753
- performance test for, RP679
- silk, performance specification for, M149
- sizes, measurement, C149
- testing, C422
- Hospital beds, R24
- chinaware, R40
- cotton textiles, R74
- huck towels, specification, C313
- plumbing fixtures, R106
- rubber sheeting, CS38
- sheeting for mattress protection, CS114
- Hospitals, (wool, and wool and cotton) blankets for, commercial standard CS136
- Hot-rolled carbon steel bars and bar-sized shapes, R222
- carbon steel structural shapes, R216
- Hot-water bottles, specifications, C248, C249
- storage tanks, R25
- Hot-wire ammeters, S206, C74
- anemometer, T287, RP850
- Hotel chinaware, R5
- House, care and repair, BH15
- construction, low-cost, method of determining structural properties, BMS2
- Household insecticide, liquid spray type, CS72
- materials, C70
- measurements, C55, M45
- safety, C75, C397, C463
- weights and measures, (card), M39
- Housing, low-cost (see list of Building Materials and Structures Reports, p. 207. Indexed also under specific subjects.)
- plumbing, BMS66
- research, BMS1
- terms, glossary, BMS91
- recommended building code requirements, BMS88, BMS107
- Hue of surface colors, RP1285
- Humidities, survey of, in residences, BMS56
- Humidity cabinet, constant, C453
- control in brick industry, T370
- control in libraries, M128
- correcting engine tests for, RP118
- effect on properties of paper, C445
- effect on strength and elongation of silk yarns, RP1353
- effects on textile materials at elevated temperatures, RP1303, RP1304
- influence on resistances, S73
- measurements with radio meteorograph, RP1082, RP1102
- relative, changes in dimensions of floor coverings with changes in, BMS85
- relative, inside concrete, RP1334
- Hycar O. R. synthetic rubber, heat capacity, RP1487
- Hydrated calcium silicates, formation at elevated temperatures and pressures, RP1147
- calcium silicoaluminates, RP1623
- Hydrated lime, C337
- for cooking paper rags, specification, C96
- for glass manufacture, specification, C118
- for making silica brick, specification, C153
- for manufacture of calcium arsenate, specification, C203
- for manufacture of sugar, specification, C207
- for purification of water, specification, C231
- for soap making, specification, C372
- for structural purposes, specification, C204
- Hydration, heat of, of cement, effect of glass content, RP1127
- of portland cement, T43, RP684
- Hydraulics, equation of motion for steady mean flow of water in open channels, RP1488
- flow in pipe bends, RP965, RP1110
- open channels, RP1151
- scour of river beds, RP907
- Hydriodic acid, pressures developed by, on heating, RP1622
- p-Hydrobenzoic acid and some of its esters, dissociation constants, RP1686
- Hydrocarbon, liquid fuels, thermodynamics of reactions for producing, RP1634
- and gas mixtures, mass spectrometer analysis, RP1664
- rubber, behavior in a molecular still, RP1202
- standard samples, RP1744
- Hydrocarbons, (see also Petroleum)
- Hydrocarbons, acetylene, thermodynamic properties, RP1682
- aliphatic preparation and properties, RP1779
- alkylbenzene, heats, equilibrium constants, and free energies of formation, RP1732, RP1728
- analysis and structure by near infrared absorption spectra, RP1072
- aromatic, analytical determination by adsorption, RP1582
- aromatic, separation and recovery from paraffins and naphthenes by adsorption, RP1583
- determination of purity by measurement of freezing points, RP1676
- boiling points, RP921
- critical solution temperatures, RP728
- crystal behavior, RP1000
- determination of formulas, RP236
- determination of molecular weights, RP215
- energies of atomic linkages of normal gaseous paraffin, RP692
- heats of combustion and formation, RP966, RP1702, RP1714, RP1715, RP1722.
- heats of combustion and formation of the normal olefin, RP1028
- heats of combustion and isomerization, RP1665
- individual, determination in mixtures of hydrocarbons by measurement of freezing points, RP1584
- infrared absorption spectra, RP610, RP1769
- in alkylates and hydrocodimers, RP1795
- in the gasoline fraction, RP1571
- in petroleum, RP967, RP1800
- in petroleum, physical properties, RP1423
- liquid, density balance for, RP1685
- melting and freezing curves, RP1397
- normal, synthesis and physical constants, RP482
- paraffin, heats of combustion, RP1607, RP1642
- paraffin, heats and free energies of formation, RP1642, RP1650
- paraffin, isolation from crude synthetic isooctane, RP1027
- preparation and properties, RP1271, RP1306
- properties, method for calculating, RP1651
- purification and properties, RP1695
- purification, purity, and freezing points of American Petroleum Institute-Standard and American Petroleum Institute National Bureau of Standards series, RP1752

(Continued on next page)

- purification by crystallization from liquid methane, RP552
 purification by silica gel adsorption, RP1642
 separation and determination, RP1652
 separation by azeotropic distillation, RP1402
 separation by distillation, RP1123
 specific heat of vapors, RP1640
 structure by near infrared absorption spectra, RP1017
 theoretical analysis of time-temperature, freezing, and melting curves for, RP1585
 thermodynamic properties, RP1747
 vapor pressures and boiling points, RP1670
 Hydrocellulose from cotton, determination of aldehyde groups, RP1432
 Hydrochloric acid, pressures developed by, on heating, RP1622
 process for production of alumina from clay, RP1756
 Hydrocodimers, analysis, RP1795
 Hydrodynamics of gravity waves, RP1272
 Hydrogen, analysis, by combustion, RP1577
 analysis by thermal conductivity method, T249
 atomic weight, S77
 chloride, thermodynamic data, RP499
 decarburization of ferrochromium by, S448
 determination by vacuum fusion, S514
 electrodes, use, RP1495, RP1524, RP1537, RP1559, RP1567, RP1580, RP1586, RP1598
 heat of combustion, RP259
 in steel, RP1373
 ionization and resonance potentials, S400
 isotopic fractionation, RP729
 molecular volumes and expansivities, RP1023
 permeability of synthetic films, RP750
 separation of isotopes, RP601
 spectrum, S146
 sulphide from vulcanized rubber, RP162, RP464
 sulphide in gas, T41
 thermodynamic properties, RP1634, RP1747
 Hydrogen-ion activity of acid potassium phthalate, RP1586
 activity of borate-chloride buffer solutions, RP1609
 activity, potentiometric method for measuring, RP1261
 concentration, S178, S286, S364
 concentration of borax buffers, RP1721
 concentration of calcium aluminate solutions, RP34
 concentration of soils, RP1639
 concentration, weakly buffered solutions, RP634
 standards, RP1495, RP1524, RP1559, RP1567, RP1580, RP1586
 Hydrogen-reduction method for determination of oxygen in simple and alloy steels, RP1114, RP1115
 Hydrogenation of ethylene, heat of, RP933
 of lubricating petroleum oils, RP1144, RP1145
 of monoolefin hydrocarbons, heats of, RP1702
 Hydrolysis, catalyzed, of proteins, RP1503
 of calcium silicates, RP687
 of disaccharides by enzymes, RP1398
 of ruthenium chloride solutions, RP125
 of sodium oxalate, S178
 of turanose, RP1356
 Hydrolytic precipitation, analytical separations by, RP1519
 Hydrometer correction tables and thermal-density coefficients for vegetable tanning extracts, C449
 Hydrometer corrections for tanning extracts, RP1612
 Hydrometers, master scales, C19
 scales, standard Baumé, C59
 temperature corrections, for Baumé scale, C295
 testing, C16
 Hydroxides, precipitation, RP1519
 Hydroxyl ion, activity coefficients in solutions of calcium hydroxide, RP584
 8-Hydroxyquinoline in separations of aluminum, RP86, RP533
 in determination of Al, Be, and Mg, RP813
 Hygrometer, electric, applied to humidity measurements inside concrete, RP1334
 electric type in improved radio sonde, RP1329
 electric type in radio meteorography, RP1102
 measuring humidity at high altitudes, RP1265
 Hygroscopicity of glasses, RP1706, RP1719
 Hypersensitization, mechanism of, RP525
 Hypersensitizing without the use of ammonia, S422
 Hypo tanks, resistance to acid attacks, RP864
 Hypochlorite disinfectant, deodorant, and germicide, liquid, CS68
 Hypodermic needles, dental, R108
 medical and surgical (for hospital use), R224
 Hysteresis, elastic, RP443
 in calomel half-cells, RP1018
 in measuring instruments, S328
 magnetic, determination, RP845
 magnetic, values from high magnetizing forces, S383
 statical, in flexure of bars, T332, T365
 thermometric, S185

I

- Ice bags, rubber, specifications, C227, C228
 cake sizes, R96
 compartments, refrigerator, R109
 density at 0° C, RP1796
 heat of fusion, S209, S248, RP1260
 point, reproducibility, RP658
 point, thermodynamic temperature, S57
 specific heat and heat of fusion, S248
 Icebergs, ocean temperatures near, S210
 Ice-cream brick molds and cartons, R120
 cans, tinned-steel, R164
 cups and cup caps, R132
 Ideal gas, definition, S136
 Identification lamps for vehicles, CS83
 Ignition shielding in aircraft, RP158
 Ignition systems, automotive, electrical character of spark discharge, RP1032
 Ilkovic equation, applications to quantitative polarography, RP1631
 Illuminants, artificial, daylight efficiency, S125
 color grading, S443
 Illuminating gas, determination of ammonia, T34
 specifications, T14
 sulphur in, T20
 Illumination from radiating disk, S263
 Image brightness with optical instruments, C27
 Immersion method for measuring indices of refraction, RP1575
 Impact and vibration, compensation of strain gages for, RP1005
 strength of cast-iron pipe, T336
 tests on bolts, RP763
 tests of metals, T289
 tube, theory, RP49
 Impedance, input, of three-electrode vacuum tube, S351
 Impulse generator problems, RP929
 Inclometers, aircraft, T237
 Indentation, Brinell, RP903
 tests, Brinell and Rockwell, T334, RP185
 tool, diamond, RP1220
 Index of refraction (*see also* refractive index)
 air, S327
 fused quartz, RP112
 fluorocrown glasses, RP1659
 of glass, S521, RP1575
 measurement, RP64, RP262, RP1535, RP1572, RP1575
 of optical glass, effect of heat treatment, S572
 of optical glass, increased uniformity in, S572
 of rock salt, S418
 of some soda-lime-silica glasses, RP816
 Index to reports of National Conferences on Weights and Measures, M172
 Indexing of radio subjects, C385
 Indicators, dial, CS(E)119
 pH, polar structure, RP1263
 metacresolsulfonphthalein, RP1569
 Indium, spectrographic determination in tin, RP1451
 thermal expansion, RP1541

- Inductance, absolute measurement, S9
 calculation of, S29, S31, S41, S42, S47, S56, S58, S59, S74, S75, S76, S80, S83, S84, S93, S138, S169, S320, S492, S498, RP16, RP18, RP24, RP94, RP304, RP479, RP1178, RP1302, RP1346
 coils and spirals of large wire, RP90
 coils, distributed capacity, S427, S430, S468
 coils, electrical oscillations, S326
 coils, high-frequency resistance, S430
 coils of polygonal form, S468
 effective, iron and bimetallic wires, S252
 formulas, methods for deriving, RP16
 formulas, summary of, S93, S169, S320
 four-terminal resistance standards, S281
 helix, S537, RP479
 low-resistance standards, S246
 measurement by Anderson's method, S14
 multilayer coils, S455
 mutual, any two circles, RP18
 mutual, and torque between two concentric solenoids, RP24
 mutual, circle and a coaxial single-layer coil, S56, S169
 mutual, coaxial circles, S138, S492, S498
 mutual, coaxial helices, RP1178
 mutual, coaxial solenoids, S41, S42, S58, S59
 mutual, concentric solenoids, RP1208
 mutual, parallel helices, RP1346
 mutual, single-layer, bifilar, absolute standard, RP1302
 mutual, two parallel circles, RP94
 of conductors, S80, S374
 resistance coils, S175, S177, S246, S281, RP133
 self, circles, S75, S169, C74
 self, dual bridge for measurement, RP1310
 self, of coil, S31, S37, S47, S74, S76, S83, S84
 self, of solenoids, S76, S84, S472
 standard solenoid, effects of variations in pitch, RP304
 standards, S15, S29, RP342, RP857, RP1137
 toroidal coil, S74
 Inductance and capacity, distributed, in secondary coupled circuit, S126
 Induction coils, S543
 magnetic, in straight bars, S117
 magnetic saturation of iron, RP1354
 measurement in short bars, S458
 residual, varying with magnetizing force, S384
 Inductor, self and mutual, variable, S290, RP1040
 Industrial mineral wool products, all types — testing and reporting, CS131
 Infiltration, air, BMS45
 Infrared absorption spectra of some hydrocarbons, RP1769
 absorption spectrum of liquid methylcyclopentane, RP375
 absorption spectra, rare-earth oxide glasses, RP1761
 absorption and reflection spectra, S45, S168
 arc spectra photographed with xenocyanine, RP473
 emission spectra of krypton and argon, RP1790
 rays, protecting eyes from, T93
 transmission and refraction data, lens and prism materials, S401
 transmission of window glasses, RP113, wavelengths of chlorine, RP73
 Ingots, sink-head and ordinary rail, T178
 Inhibitors of corrosion in air-conditioning equipment, RP1305
 Ink, analysis, T39, C53, C95
 black waterproof drawing, specification, C196
 colored waterproof drawing, specification, C301
 copying, specification, C182
 for recording instruments, RP935
 general information, C95, C400, C413, C426
 indelible, for fabrics, specification, C197
 iron gallate, RP807
 pigments, light fastness of lithographic, RP100
 printing, T39, C53
 record, specification, C182
 red, specification, C184
 relation to preservation of records, RP779
 stamp-pad, quick-drying, RP1087
 stamp pad, specification, C185
 testing, T39, C53, C95, M15
 writing, specification, C183
 Inner tubes, specification, C115
 Input impedance of three-electrode vacuum tube, S351
- Inquiry forms, commercial, R37
 Insect wire screening, RP803, CS138, R122
 Insecticide, household, liquid spray type, CS72
 Insecticides and fungicides, package sizes, R41
 household, containers and packages for, R203
 Inspector's check list for building construction, BMS81
 Instability of structures, RP1163
 Institutional cotton textiles, R74
 Insulated Steel Construction Company's "Frameless-Steel" constructions, structural properties, BMS9
 tape, rubber, specification, C230
 Insulating board, fiber, BMS13, CS42
 board, fiber, experimental dry-wall construction with, BMS97
 board, structural, R179
 board, manufacture from cornstalks, M112
 board, properties of, M132
 fiberboard, "Homasote", properties, BMS48
 lath, fiber, suitability as plaster base, BMS3
 materials, electrical, S234, S352, S471, T216, C74
 materials, electrical, thermal expansion, S352
 materials, seasonal variation of phase difference, T284
 materials, volume and surface conductivity, S234
 properties, measurement, S471
 Insulation of buildings, thermal, C376
 ceilings, BMS52
 mineral wool, for heated industrial equipment, CS117
 pipes to prevent electrolysis, T15
 sheathing, fiber, BMS13
 sound, C403, C418
 sound, of walls and floors, BMS17 and Supplement
 thermal, RP207
 Insulators, porcelain, R73
 Insulite Company's "Insulite" partitions and wall structural properties, BMS31
 Intercarboxylic distances of α -phthalic acid, RP1687
 Integrating circuit for Geiger-Müller counters, RP1330
 sphere, S391, S405, S415, S447, RP3
 Intensity distribution in the line emission spectrum of cesium, RP901, RP948
 Interface of liquids, velocity distribution at, boundary layers, RP1591
 Interference apparatus for testing haemacytometers, S507
 bands, change in order of, due to changes in air pressure and temperature, S199
 bands, oscillatory, S150
 bands, measurement of wave lengths, S142, S179, S251, S274, S302, S329, S414, S478, S479, RP4, RP992
 colors, oxidation rates of metals determined by, RP1470
 colors of oxide films, use in determining rate of oxidation of steels, RP1221
 fringes, photographing, RP1668
 measurements in arc spectrum of iron, RP755
 measurements in spectra of noble gases, RP710
 method of measuring thermal expansion, RP515
 methods for standardizing gage blocks, S436
 Interferometer for measuring temperatures of air near heated surfaces, RP452
 gas analysis, T131
 gas, calibration, S316
 measuring, thermal dilatation, S365, S393, S485
 method for determining chemical durability of glass, RP1409
 method for expansion measurements of glass, RP1445
 Interferometric measurement of dimensional changes in rubber, RP1253
 methods for expansion measurements, RP1227
 Interferometry measurements on expansion of iron, RP1597
 photographic apparatus for, RP1668
 International committee on electric units and standards, report to, M16
 comparison of temperature scales between 660 and 1,063° C, RP573
 electrical units, S3, S102, S171, S292, C29, C60
 ohm, standard resistors for maintenance, RP1692
 temperature scale, RP22

(Continued on next page)

- Temperature Scale above the gold point, RP1189
 Temperature Scale, reproducibility between
 —190° and 445° C, RP1454
 unit of light, C15
- Interpolation of color excitation data, RP334
 method of Lagrangian curvilinear, RP1667
- Intrinsic energy of gases, variation with pressure,
 RP503
- Inulin, difructoses prepared from, RP1784
 hydrolysis, S519, RP79, RP251
 hydrolysis by enzymes, RP1526
 molecular weight of, RP251, RP299
- Inverse-rate method for thermal analysis, S336,
 T230
- Inversion of dicalcium silicate, RP1570
 quartz, S557
- Invert sugar, analysis, RP1638
 determination and preparation, RP1417
 Other method for determination, RP1757
 "solubility," T259
- Investment, dental, packaging, R117
- Invoice forms, R37
- Iodine, ionization and resonance potentials, S400
 number of linseed and petroleum oils, T37
 number of wool and other proteins, RP689
 pentoxide apparatus for carbon monoxide, T222
 spectrophoto-electrical properties, S462
 titration for total effective cyanide, RP384
 voltameters, S218
- 2-Iodopentane, boiling point, optical rotation, and
 refractive index, RP1551
- Ionic strength of unknowns, determination,
 RP1580, RP1586
- Ionization, air by Lenard rays, RP924
 caesium by light between series lines, RP234
 chamber, gamma ray, RP641, RP663, RP1283
 X-ray, RP56, RP119, RP169, RP211, RP271,
 RP397, RP417, RP424, RP505, RP865,
 RP1111
cis- and *trans*-2-butene, RP1775
- Ionization, constant of metacresolsulfonphthalein,
 RP1569
 of acid mixtures, RP889
 borax buffers, RP1721
 boric acid, RP302
 boric acid and pH of borate-chloride buffer
 solutions, RP1609
 malonic acid, second, RP1284
 phosphoric acid, second, RP1524
p-phenolsulfonic acid, RP1559, RP1567
 currents, a resistance-coupled amplifier for
 measuring, RP550
 high current discharge, RP1150
 increase at night in Kennelly-Heaviside layer,
 RP582
 ionosphere during solar eclipse, RP629
 liquid carbon disulphide by X-rays, RP733,
 RP927
 potential of antimony, RP1464
 chlorine, RP73
 of columbium, RP1656
 rhenium, RP322
 scandium, S558
 xenon, RP115
 yttrium, RP55
 zirconium, RP202, RP205, RP296
 six nonmetallic elements, S400
 upper atmospheric, RP1159, RP1363
- Ionosphere — (*see also* Kennelly-Heaviside layer)
 characteristics and application to communica-
 tion, RP632, RP1001, RP1013, RP1167
 constitution of, and polarization term, RP1363
 data from 1930 to 1935 correlated with sunspots
 and terrestrial magnetism, RP913
 heights recorder, RP582, RP608
 layers, critical frequencies, RP632, RP769, RP-
 780
 measurements, vertical and oblique incidence,
 RP1096, RP1100
 recombination and electron attachment in,
 RP1342
 recording equipment, field, RP1384
 sudden disturbances, RP1016
- Ions, aluminum and hydrogen, retention in papers,
 RP1262
 scattering of electrons, RP535
- Iridium, analytical separation, RP655
 determination, RP489
 determination in dental gold alloys, S532
 freezing point, RP568
 reflection, S45
 separation of osmium from, RP286
 spectrum, S499
- Iron, absorption spectrum, S551
 alloys, production, heat treatment, and proper-
 ties, C409
 alloys with carbon and manganese, S453
 analysis, S457, T33, T118, C14
 and bimetallic wires, inductance, S252
 arc spectrum, RP755
 cast, determination of boron in, RP1120
 cast, elastic properties, RP1176
 cast, graphitized upon annealing, T129
 cast, locomotive-cylinder parts, T172
 cast, transverse-strength test bars, RP880
 cast, wet process enameling, T246
 colorimetric determination of, S53
 demagnetization in magnetic testing, S78
 density, S562
 determination in dental gold alloys, S532
 determination in silver-plating solutions, RP384
 determination of carbon in, T33
 determination of nitrogen in, S457
 determination of tin in, RP415
 elastic properties, RP1459
 electrodeposition, S266, RP991
 electrolytic corrosion in soils, T25 (*see also* Soil
 Corrosion)
 etched by ammonium persulphate, S402
 gray cast, effect of casting conditions on proper-
 ties, RP726
 group elements, melting points, S62
 high-purity, preparation, RP1226
 hot shortness, S571
 in brass, effects on magnetic properties, T221
 interferometry measurements on expansion,
 RP1597
 losses in transformers, S88, S164
 magnetic saturation induction, RP1354
 melting point, RP1375
 microstructure at high temperatures, S356
 ores, analysis, C26
 oxide, emissivity, S249
 oxide, pure, preparation, RP996
 oxygen in, by Ledebur method, T118
 pipe, wrought, mechanical properties, RP124
 pure, critical ranges, S213, S296
 pure, electrical resistance and critical ranges
 S236
 pure, properties, RP860, RP1472
 red shortness, T261
 roofing, R78
 rustproofing, C80
 salts for tanning leather, RP1566
 separation from iridium, S483
 sheet and plate, gage, C18
 spectrum, S251, S274, S324, S478, S479, S551,
 RP4, RP755, RP992, RP1062, RP1222,
 RP1288
 spectra, pressure displacements, RP1222
 spectrographic determination in tin, RP1451
 stainless, thermal expansion of, S570
 structural features, unusual, S356, S571
 thermal expansion, S433
 thermoelectric properties, S120
 wires, effective resistance, S252
 wrought, microstructure, T97
 wrought, various processes of puddling, RP124
- Iron and steel pop safety valves, R201
 relief valves for petroleum, chemical, and
 general industrial services, R205
 and bronze relief valves; bronze pop safety
 valves, R204
- Iron-carbon alloy and carbon steels, influence of
 initial structure and rate of heating on
 austenitic grain size, RP1481
 alloy, formation of austenite from aggregates
 of ferrite and cementite in, RP1489
 alloys, effect of manganese on microstructure,
 S464
 alloys, magnetic properties, S463
 alloys, structure, RP1403
 alloys, thermal analysis, S484
 oxides, liquid, RP606
- Iron-chromium alloys, thermal expansion, S570,
 RP388

Iron-constantan, copper-constantan thermocouples, reference tables, RP1080
 thermocouples, stability, RP1278
 Iron-nitrogen system, study of, RP1226
 Iron-nickel-chromium alloys, flow characteristics, RP192
 Iron-oxide and iron-hydroxide paints, specification, C93
 Iron and steel, nitriding of, RP1226
 roofing, R78
 scrap, classification, R58
 Ironers, flatwork, commercial laundry, R140
 Irons and steels, zinc in, RP664
 ISCC-NBS system of color names, RP1565
 Isobutane, heat capacities, RP1804
 heat of combustion and formation, RP833
 Isobutene, specific heat of vapor, RP1640
 Isoelectric point of collagen, RP1230
 of silk, RP490
 wool, RP451
 Isohydric indicators, RP302
 Isomeric crystalline compounds of *d*-mannose with calcium chloride, RP106
 Isomerization of butanes, pentanes, hexanes, and heptanes, RP1440
 butene, RP1592
 equilibria of, of the 18 octanes, RP1641
 heptanes, heats of, RP1439
 hexanes, heats of, RP1420
 octanes, heats of, RP1635, RP1642
 Isononane in petroleum, RP1173, RP1184
 separation from petroleum, RP955
 Isooctane, crude synthetic, isolation of paraffin hydrocarbons from, RP1027
 (2,2,4-trimethylpentane), properties, RP1160
 Isopentane, heat of combustion, RP1193
 Isoprene, heat-capacity and entropy, RP1044
 heat of combustion, RP1093
 properties, RP951
 Isopropylbenzene, isolation from petroleum, RP-1122
 Isotherms of gases, RP1393
 critical, of various substances, equation for, RP1493
 Isotopes, concentration of potassium, RP1765, RP1766
 chlorine, concentration by the countercurrent electromigration method, RP1767
 hydrogen and oxygen, fractionation, RP729
 mercury, concentration by free evaporation, RP1764
 oxygen, RP820
 theoretical aspects of the electromigration method for concentrating, RP1766
 Isotopic composition of natural waters, RP656
 forms of water, properties, RP703
 fractionation of water, RP601
 Ivory nuts for the preparation of *d*-mannose, RP1357

J

Jacks, screw, bell-bottom, R97
 Jamesonite, photoelectric properties, S322, S344, S462
 Japan coating, specifications and tests, C275
 Japanned ware, R55
 Jar rings, M181
 Jerusalem-artichoke juices, extraction, RP1025
 Jets of gas, contraction coefficients, RP303
 Jewelry and novelties of silver, marking, CS118
 Joints, interchangeable ground glass, CS21
 open web steel, R94
 soldered, strength of in copper tubing, BMS58
 Joists, open-web steel, R94
 precast concrete, structural properties of floor constructions, BMS62
 Journal bearings, design, RP1037
 safe operation, RP1295
 Jute burlap, specification, C352
 cement sacks, comparison with cotton, T292
 microscopic structure, RP1482
 twine, soft fiber, R110

K

Karat gold articles, marking, CS67
 Kalamein single-acting swing doors, frames and trim, R83
 Kaolinite, synthesis, RP819
 Kaolin minerals, thermal behavior, RP792

Kaolins, properties after heating, RP410
 Karman's theory of column strength, T263
 Kauri gum varnish, durability, RP146
 Keene's cement, C151
 Kennelly-Heaviside layer (*see also* Ionosphere)
 heights, automatic recorder for, RP373
 heights, investigations, RP246, RP390, RP582
 ionization, RP1363
 multi-frequency heights recorder, RP608
 5-Keto-gluconic acid, oxidation with oxygen in alkaline solution, RP1680
 Ketoses, reactions with chlorites, RP1408
 Kiln scumming of brick, T370
 Kilocycle-meter conversion table (chart), M67
 Kilowatt, relation to horsepower, C34
 Kinetic-energy matrix, calculation, RP1758
 Kinetics of physical adsorption and desorption of gases, RP1674
 Kitchen accessories, colors, CS62
 Knap America Inc.'s "Knap Concrete Wall Units" wall, structural properties, BMS40
 -Concrete-Unit" walls, water permeability and weathering resistance, BMS94
 Knit underwear, CS33
 Knives, pocket, R99
 Knock rating in CFR engines, effect of altitude, RP1475
 Knock ratings of substitute motor fuels, RP1673
 Koenig-Martens spectrophotometer, RP30
 Koenigs-Knorr reaction, orthoester formation in, RP1429
 Koepsel permeameter, S228
 Kolster decremeter, S235, C74
 Koppers type oven for coking Illinois coal, T137
 Kraft paper, No. 1, sealing tape, R114
 Krypton and argon, infrared emission spectra, RP1790
 hyperfine structures, RP351
 spectrum, S345, S414, RP89, RP245, RP351, RP364, RP540, RP599, RP710, RP781, RP1061

L

Laboratories, directory of commercial testing and college research, M90, M125, M171, M187
 Laboratory observations of condensation in wall specimens, BMS106
 ware, porcelain, T105
 Lace leather, specification, C213
 accelerated aging, RP1483
 Laces, shoe, braided, R168
 Lacquer, clear, durability, RP146
 Lacquered silver, reflecting power, S342
 Lactobionic acid, basic calcium salt, RP82
 δ -lactone, preparation, RP618
 Lactones of aldonic acids, RP613
 Lactoses, oxidation with bromine water, RP82, RP441
 Lactulose octaacetate, preparation and properties, RP1663
 Ladle sleeves, thermal expansion, RP1084
 Lag, *see* Hysteresis
 Lag, thermometric, RP222
 Lag bolts, packaging, R60
 steel, stock production sizes, R169
 Lagrangian curvilinear interpolation, method of, RP1667
 Laminar boundary layer flow, RP1772
 flow at interface of two liquids, velocity distribution, RP1591
 Lamp base screw threads, M89, H28
 tungsten-in-quartz, applications in photoelectric radiometry, RP1543
 Lampblack, reflecting power, S196
 Lamps, adverse weather, vehicle, CS81
 arc, cadmium vapor, S371
 carbon, photometry, S115
 clearance, marker, and identification, for vehicles, CS83
 color temperature, RP252, RP677
 efficiency, S30, S113, S253
 electric, supplementary driving and passing, for vehicles, CS97
 flame standard, S216, S222
 frosted, life, S61, S72
 gas, T99
 gas-mantle, efficiency, T110
 incandescent, mean horizontal intensity, S43, S63
 (Continued on next page)

incandescent, specifications, C13
 license-plate, electric, for vehicles, CS85
 life testing, S265, T325
 pentane, S216
 quartz mercury vapor, S330, S378
 spherical and hemispherical intensities, S12
 stop, electric, for vehicles, CS86
 tail, electric, for vehicles, CS84
 temperature and radiation, S40
 tungsten-filament, characteristic equations, S238, RP502
 tungsten, photometry of, S253, S264, S277
 Landing aids, aircraft radio, RP328, RP602, (*see also* Radio, aircraft)
 Lantern films, protection from heat of lamp, S378
 Lanterns, warning, electric, for vehicles, CS87
 Lanthanum monoxide, band spectrum, RP273
 spectrum S421, RP468, RP497
 Latent heats of deuterium, RP841
 Latex, Mangabeira, RP1785
 Lath, fiber insulating, suitability as plaster base, BMS3
 metal, expanded and sheet, R3
 yarn, R92
 Lathe cutting tests with tungsten carbide tools, RP206
 grinding wheels, dental, R130
 tests, effect of cutting conditions on the hardness of carbon and alloy steels, RP516
 tests, highspeed steels, T228
 Laundering, effect on heat insulating qualities of blankets, T347, RP1528, RP1529, RP1589
 Laundry extractors (commercial), R139
 flatwork ironers, commercial, R140
 soap, liquid, specification, C193
 soda, specification, C316
 tests of soap, T273
 tumblers, commercial, R141
 washers, commercial, R142
 winter damage, RP294
 Lavage tubes, C220
 Lavatory and sink traps, R21
 Laws, Federal, weights and measures, M20, H11, H26
 Lead acetate test for hydrogen sulphide in gas, T41
 aldonates, optical rotations, RP770
 amalgam electrode, emf of, RP1697
 antimony sulphide, spectrophotoelectrical sensitivity, S462
 calking, CS94
 compounds, X-ray studies, RP1392
 corrosion, S377
 corrosion in soils, RP1602
 dissolved from colored glazes, RP1196
 electrolysis, RP1213
 intercrystalline brittleness, S377
 ionization and resonance potentials, S368
 oxide-alumina-silica system, RP1564
 oxidecompounds with B_2O_3 , X-ray studies, RP1392
 oxide silica system, RP705, RP1251
 photo-electrical properties of halide salts, S456
 pipe, CS95
 red, specification, C90
 silicates, X-ray studies, RP1251
 spectrographic determination in tin, RP1451
 spectrum, S411
 sulfate, solubility, RP1165
 thermal expansion, RP500
 traps and bends, CS96
 white, basic carbonate, specification, C84
 white, basic sulphate, specification, C85
 Lead-antimony alloys, thermal expansion, RP938
 Lead-base solders, strength of sleeve joints in copper tubing made with, BMS83
 Lead-borate system, RP995
 Lead-sulphide mirrors, C389
 Lead-tin alloys, properties, RP248
 Lead-tin-bismuth-cadmium alloys, C388
 Lead-zinc oxide, specification, C88
 Leadless borosilicate glazes, T31
 Least squares, theory, S304, S388
 Leather, accelerated deterioration, RP1004, RP1109, RP1128, RP1319, RP1418
 adsorption of sulphuric acid, RP249
 adsorption of water vapor, RP1763
 area measurement, T153
 bag, case, and strap, CS34
 bag, specification, C338
 belting, specification, C148
 chrome-tanned calf, effect of moisture, RP583
 chrome-tanned, effect of acid, RP802
 chrome-tanned sole, wear tests, RP834
 cleaning, T360
 compressive tests, RP1672
 decomposition products, RP909
 density, RP1556
 deterioration, RP835, RP846
 deterioration by sulphuric acid, RP547, RP761, RP802, RP811
 effect of jaw speed on strength and stretch, RP1321
 harness, physical properties, T160
 hydraulic packing, specification, C340
 iron-tanned, RP1566
 lace, accelerated aging, RP1483
 lace, specification, C213
 pH measurement, RP805
 resistance to wear, RP834
 rigging, specification, C339
 sole, durability, T138, T197, T215, T286, RP834
 sole, specification, C198
 sole, wearing quality, RP1626
 stability at elevated temperatures, RP1418
 tanning materials, RP835
 upholstery, specification, C212
 vegetable-tanned strap, effect of mildew, RP1713
 wear relative to location in hide, T147, T166
 Leathers, hydrolysis of chestnut and quebracho tanned, by sulphuric acid, RP362
 Ledebur method, for determining oxygen in steels, S346, S350, T118
 Lenard rays, ionization by, RP924
 measurement, RP332
 Length changes, *see* Expansion measurements, C2
 measurements, fundamental basis, S535
 standards, S1, S17, RP743, M64
 standards, calibration of, C329, C332
 Lens, axial aberrations, S311
 compensation for absorption, reflection, and vignetting losses by aperture ratio markings, RP1803
 converging, focal length, S110
 design, S550
 grinding tools, attachment for turning on lathe, RP467
 material, standard, S401
 resolution, charts for testing, M166
 resolution, test, C428
 Lenses, aberrations, S311, S461, S494, RP102, RP466
 airplane-camera, resolving power and depth of focus, RP1636
 airplane-camera, resolving power and distortion, RP1216
 blown, drawn, and dropped, for sun glasses, CS79
 camera for testing, RP984
 ground and polished, for sun glasses, CS78
 spherical aberration of thin, S461
 wide-angle airplane-camera, characteristics, RP-1498
 Levulose, analysis, RP1638
 determination, RP495, RP1417
 preparation, S519
 properties, RP426
 stability, RP611
 yield and purity, RP832
 Leyden jars, energy losses, S190
 Libraries, preservation of documents, M128, M140, M144, M154, M158, M162, M168
 Library air, removal of sulphur dioxide, M142
 License-plate lamps, electric, for vehicles, CS85
 Light, effect, on silk, RP385
 effect on silver chloride in chemical analysis, RP134
 emission of plants and animals, S538
 fastness of lithographic ink pigments, RP100
 filters, S168, S191, T217, M114, RP374
 Fresnel reflection of diffusely incident, RP1504
 mechanical equivalent, S305, RP699, RP1189
 reflection measurements, S391, S405
 scattering in liquids, RP175
 sensitivity of rosin paper-sizing materials, RP307
 sources, monochromatic, S44
 stability of papers, RP1517
 standards, S50, S216, S222, RP325, RP699, C15
 unit, international, C15
 velocity, S65, RP83
 Waidner-Burgess standard, RP325
 waves as a basis for length measurements, S535
 waves in standardizing gauges, S436

- Light-scattering materials, optical specification, RP1026
- Lightning arresters, M95 (also called H13)
protection of electrical equipment, M95 (also called H13)
protection of persons and buildings, T56, M92 (also called H12), H17, H21, H40
- Lights, color designations, RP1565
sidewalk, floor, and roof, R49
- Lime, absorption of carbon dioxide, C189
aluminate hydrates of, and hydrate of, in the system $\text{CaO-Al}_2\text{O}_3\text{-H}_2\text{O}$, RP1539
bags of paper, T187
barrel law, M1, C64
binary system with boric oxide, RP510
definitions and specifications, C106
for cooking paper rags, specification, C96
free, effect on decomposition of tricalcium silicate, RP381
heat of solution and hydration, RP1121
hydrated, for structural purposes, specification, C204
in mortars, T308
manufacture, T16, C337
mortars, properties, RP952
particle size and distribution, RP1232
powder and limestone for manufacture of sugar, specification, C207
properties and uses, C30
purification of water, specification, C231
quick-, specifications, C150, C153, C201, C372, C373
system $\text{CaO-Na}_2\text{O-Al}_2\text{O}_3$, RP414
system lime-boric oxide-silica, RP941
- Lime and limestone for glass manufacture, specification, C118
- Lime and magnesia, free, in portland cement clinker, RP1358
- Lime-ferric oxide-silica system, RP1340
- Lime-silica-water system at 30°C , RP687
- Limes, hydration of magnesia in, RP1022
- Limestone, determination of magnesia in, RP265
manufacture of sulphite pulp, specification, C144
permeability, T305
physical properties, T349
- Line absorption, photo-ionization of caesium by, RP186
- Linear measures, C2, C61
- Linen, ultraviolet transmission, RP6
- Linen-content papers, substitutes, RP1701
- Lining, brake, automobile, R66
- Linoleum, battleship, specification, C191
plain, inlaid and printed, specifications, C190
- Linseed oil, affected by pigments, T71
boiled, specification, C82, C330, C362
density and thermal expansion, T9
infrared spectral transmission, S168, S418
iodine number, T37
raw, specification, C82, C361
- Liquefaction of air, S123
temperatures by a conductive method, RP57
- Liquid air, production on a laboratory scale, S419
capacity measures, C61
films, thickness, RP1332
measuring pumps, T81
- Liquid-junction potentials, RP1608, RP1632
- Liquids, optical rotation, M118
- Lithium, spectrum, S312
- Lithographic ink pigments, light fastness, RP100
papers, RP480, RP730
papers, effects of humidity and temperature, RP633
- Lithopone paint, specification, C111, C147
- Load on walls and partitions, BMS27, BMS31
- Load-elongation apparatus for fibers, autographic, RP1546
- Loaded paper shot shells, R31
- Loading charts for electrical transmission lines, M176
coil for home-made radio set, C137
- Loads, building code requirements for, M179
critical, RP1163
dead and live, for building, M179
dwelling construction, BMS107
minimum design for building, M179
plumbing systems, methods of estimating, BMS65
- Lock nuts, torque on, RP386
- Lockers, steel, R35
- Locks, specification, C275
- Locomotive-cylinder parts, T172
- Logging Safety Code, H5
- Lorentz polarization term in ionosphere, RP1363
- Lorenz apparatus, S56
- Lovibond color system, grading of oils, RP815
glasses, S547, RP31, RP58, RP653, RP718
- Low-cost housing. (see list of Building Materials and Structures Reports, p 207. Indexed also under specific subjects.)
- Low-cost housing research, (general plan), BMS1
- Lubricating films, thickness, RP264
oil, chemical constitution and physical properties, RP849, RP953, RP954
oil, extraction with acetic acid, RP1067
oil fractions, properties, RP1142, RP1143, RP1144, RP1145
- Lubricating oils, (see also Oils)
action of sunlight and air, S153
carbonization, C99, T4
mineral, evaporation test, T13
reclamation, T223
testing, M15, T223
- Lubrication of journal bearings, RP1037
- Luggage, R125
- Lumber, dimension, hardwood, CS60
softwood (includes shingles and mouldings), R16
stock, rotary-cut, for wire-bound boxes, R59
tank stock, cedar, cypress, and redwood, CS92
- Luminaire, photometer for measuring, RP1646
- Luminescence of plants and animals, S538
- Luminosity factors, M86
radiation, (see Visibility)
screen, S303
- Luminosity and temperature, S133
black body, S270, RP325, RP699
- Luminous compound, radioactive, safe handling, H27
dials, measurement of brightness, RP804
efficiency of radiant energy, S103, S305, S475, RP699, RP1189
efficiency of the firefly, S132
intensity units of four countries, S50
material, determination of brightness, RP702
- Lutecium monoxide, spectrum, RP1071
spectra, RP187, RP1008
- Lye, caustic soda, specification, C315

M

- Machinability, steel forgings, RP319
tungsten carbide lathe tools, RP206
- Machine bolts, packaging, R60
steel, (stock production sizes), R169
- Machine-gun barrels, life, T191
- Machine-finished surfaces, measurement of roughness, RP1708
- Machinery, cotton, T277, T282
- Machines, testing, calibration, RP1009
- Magnesia, caustic, T239
cement, plastic, specification, C323
crucibles, in preparation of pure iron, S453
determination in portland cement, RP569
effect on constitution of K_2O -bearing clinker, RP1512
hydration, RP1022
influence upon temperature of liquid formation in portland cement mixtures, RP132
linear expansion of masonry cement mortars, RP1548
phosphate rock, RP484
properties of portland cement, T102
systems and porcelains, RP1703
- Magnesite cement and stucco, C135
- Magnesium alloys, T132, C346
alloys, anodic coating, RP964
ammonium phosphate, precipitation and ignition, RP200
critical potentials, S403
determination by 8-hydroxyquinoline, RP265
oxide and hydroxide, heat of solution, RP1121
separation from aluminum, RP813
spectrum, S312
- Magnesium and magnesium alloys, thermal expansion, RP29
- Magnet steels, choice and utilization, S567

Magnetic alloys, Heusler, S38
 analysis of rifle-barrel steel, S343
 analysis of wire hoisting rope, T315
 balance for inspection of austenitic steel, RP532
 charge, S566
 compasses, S382
 determination of iron in brass, T221
 field, uniform, RP716
 flux, waveform, S87
 hysteresis, S106, S383, RP845
 induction and coercive force, variation with magnetizing force, S384
 measurement of thickness of nickel coatings, RP994
 method for measuring thickness of nonmagnetic coatings, RP1081, RP1240
 permeability, drift, after demagnetization, RP714
 permeability, temperature coefficient, S245
 permameters, standardization at high magnetizing forces, RP279
 properties in relation to mechanical properties, S272, S496
 properties of iron-carbon alloys, S404, S408, S463
 properties of steel and repeated stresses, RP26
 properties of steel wire, effect of wear, S510
 reluctivity relationship, S546
 saturation induction of iron, RP1354
 standard bars, S295, RP140, RP279
 storms, relation to radio reception, RP76
 units, international, S292
 Magnetic-lens electron spectrometer, RP1788
 Magnetic testing, demagnetizing iron in, S78
 Fahy permeameter, S306, S545
 Fahy simplex permeameter, RP174
 general, C17, C415, C456
 Koepsel permeameter, S228
 high magnetizing forces, RP548, RP1242
 ring specimens, S108
 sheet steel, S545
 short base, S458
 straight bars, S117
 straight rods in intense fields, S361
 thermomagnetic analysis, RP50
 tool-resisting prison bars, RP894
 Magnetism, terrestrial, comparison with ionosphere data, RP913
 Magnetizing current and regulation of potential transformers, S129
 force related to residual induction and coercive force, S384
 Magneto operation, linkage current diagram for representing, S543
 theory of induced voltage, S424
 Magnets, permanent, C448
 Mail-bag duck, T277
 Maizolith, M108
 Malleable iron screwed unions, CS7
 Malonic acid, dissociation constants, RP895
 ionization, pH values, thermodynamic quantities, its purification, RP1284
 Maltose, action of enzymes on, RP1599
 Mangabeira latex and rubber, RP1785
 Manganese bronze, "burned in", T84
 corrosion under tensile stress, T135
 determination as sulphate, S186
 determination in dental gold alloys, S532
 determination in iron and steel, RP109, RP380
 dioxide for dry cells, C79
 effect on red shortness of iron, T261
 effect upon structure of carbon steels, S464
 effects on mechanical properties of pure iron, S453
 infrared arc spectrum, RP564
 ores, analysis, C26
 spectrum, S372, RP4, RP564
 Manganin, annealing for resistance standard, RP201
 resistors, stability, RP1692
 Manila rope fiber, color, RP627
 specification, C324
 tests, T198
d- α -Mannohexose, phenyl glycosides, RP1399
 Mannohexoses, mutarotation and bromine oxidation, RP1069
d- α -Mannohexoses, enzymatic hydrolysis, RP1869
 Mannose, compounds with calcium chloride, RP106
 derivatives, RP358, RP392
 preparation, S429
 ring structure, RP253

d-Mannose, preparation, RP1357
 Mannuronic lactone, preparation and ring structure, RP1727, RP1750
 Manometer, mercury, RP324
 Manometers for measuring blood pressure, T352
 Manometric gas-analysis apparatus, RP1380
 method of gas analysis, RP680
 Manostat, flow, for sugar test, RP1492
 stills, RP379
 Manual, inspection and information for weights and measures officials, M1, H1, H11, H26
 paint, with particular reference to Federal Specifications, BMS105
 visitors', M134, M153, M160
 Mapping, optical requirements of airplane, RP427
 topographic, characteristics of wide-angle airplane camera for use in, RP1498
 Maps, war, experimental manufacture of paper for, RP1751
 Maraschino cherry containers, glass, R197
 Marble cleaning, T350
 commercial, T123
 dielectric constant, power factor, and resistivity, RP1281
 permeability, T305
 physical and chemical tests, T123
 thermal expansion, S352
 Marine sextants, specifications, C110
 signal light colors, RP1565
 Standards Committee, American Marine, RX
 Marker lamps for vehicles, CS83
 Marking articles made of silver in combination with gold, CS51
 gold-filled and rolled-gold-plate articles, CS47
 jewelry and novelties of silver, CS118
 karat gold articles, CS67
 platinum articles, CS66
 Mars, temperature estimates, S512, S553, RP1458
 Martens' polarization photometer, S367
 Martensite in carbon steels, S452
 Marvin pyrheliometer, S323
 Masonry, absorption properties, RP88
 American Standard building code requirements, M174
 beams, brick, reinforced, RP504
 cement, specification, C321
 cement, ten year compressive strength and linear change of mortars, RP1548
 materials, brick, volume changes, RP321
 mortars, effect of lime on properties, RP952
 structural tile, strength, RP972
 units, permeability of walls built of, BMS82
 wall construction, minimum requirements, BH6
 Masonry walls, effect of outdoor exposure on water permeability, BMS76
 hollow $\diamond$ s, compressive strength, T311, RP310
 permeability, BMS41, BMS55
 structural properties, BMS5, BMS53
 water permeability, BMS7
 waterproofings, RP771, BMS95
 Mass spectrometer, analysis of hydrocarbon and gas mixtures, RP1664
 spectrometer analysis of standard natural gas samples, RP1789
 spectrometer study of rare gases, RP1799
 spectrometric analysis, RP1765, RP1767
 spectrometric analysis of potassium isotopes, abundance ratio, RP1765
 standards, S17, C3
 standards, short tests for sets, S527
 Master disks, CS(E)124
 Matches, safety, specification, C318
 Mathematical Tables (*see list, page 219*)
 Matting, rubber, specification, C306
 Mattress protection, hospital sheeting for, CS114
 Mattresses, bedsteads, and springs, R2
 hospital, CS54
 institution, CS55
 Maxwell bridge, use in measuring capacitance, S564
 triangle, uniform-chromaticity scale, RP756
 Measurements of heat losses from slab floors, BMS103
 Measuring devices, commercial, specifications, tolerances, and regulations for, M85 (also called H14), H22, H29
 Mechanical equivalent, heat, RP1228
 equivalent, light, RP699, RP1189
 properties of metals and alloys, C447

- Medical and surgical hypodermic needles (for hospital use), R224
- Melamine resin in currency-type papers, RP1701
- Melting curves and amounts of impurity in hydrocarbons, RP1397
- rubber, optical and dimensional changes, RP1129
- Melting and freezing curves, theoretical analysis, RP1585
- Melting and sublimation points and atomic dimensions of noble gases, RP915
- Melting point (see also specific substance)
- alumina, RP1649
 - chromium oxide, RP203
 - fusible alloys, C388
 - gallium, RP735
 - iridium, RP568
 - iron, RP1375
 - mercury, S294
 - nickel, RP258
 - palladium, S55, RP65
 - platinum, RP326
 - platinum-rhodium alloys, RP650
 - rhodium, RP127, RP676
 - rubber hydrocarbon, RP544
 - silver, RP557
 - titanium oxide, RP619
 - zinc orthosilicate, RP136
 - zinc oxide, RP136
- Melting points, chemical elements, C35, M126, M183
- conductance method, RP57
 - iron-group elements, S62
 - refractory elements, S205
 - refractory oxides, S212
- Membranes, permeability to water vapor, M127
- Men's pajama sizes — woven fabrics, CS15
- shirt sizes (exclusive of work shirts), CS135
- shorts, woven fabrics; size measurements for, CS137
- sport shirt sizes — woven fabrics (other than those marked with regular neckband sizes), CS128
- Mercuric chloride titration of alkali cyanide, RP384
- Mercurous sulphate, solubility in sulphuric-acid solutions, RP939
- Mercury arc, color, S128
- arc, spectrophotometric analysis of sugar products, RP38
 - critical potentials, S403
 - determination in silver-plating solutions, RP384
 - electrode in titration of alkali cyanide, RP343
 - freezing point, S294
 - isotopes, concentration by free evaporation, RP1764
 - poisoning, RP45, RP1383
 - spectrum, S411
 - surface, setting of, in manometer tube, S214
 - titration with thiocyanate in the presence of silver, RP1391
 - vapor hazard in scientific laboratories, RP1383
- Mercury-arc discharge, recombination in afterglow, RP1045
- Mesitylene, physical constants, RP614
- Metacresolsulphonphthalein, absorption spectrum, RP1569
- Metal doors, hollow, R82
- flashings, specification, C180
 - lath (expanded and sheet) and metal plastering accessories, R3
 - partitions for toilets and showers, R101
 - polishes, C383, C424
 - sheets and plates, gages, C391
 - spools for wire, R63
- Metal-cutting band saws (hard edge, flexible back), R214
- Metallic cartridges, R62
- coatings for rustproofing, C80
 - roofing for low-cost housing, BMS49
- Metallographic etching reagents, S399, S435, S518
- features revealed by etching steel, T156
 - polishing, RP117
 - polishing, X-ray measurement of thickness of cold-worked surface layer resulting from, RP1494
 - testing, C42, C113
- Metallography of formation of austenite from aggregates of ferrite and cementite in an iron-carbon alloy, RP1489
- Metallurgy, powder, patents, M184
- Metals, aircraft, effect of low temperatures, RP1347
- bright annealing, RP1468
 - gases in, S514, S563
 - protection in storage, T176
 - strengths and related properties, C101
 - stresses caused by cold-rolling, T163
 - structure and related properties, C113
 - thermal conductivity, RP668, RP669
 - underground corrosion, RP1446, RP1460, C450
- Metals and alloys, mechanical properties, C447
- Metals and metal products, standards and specifications, M120
- Metastability of cadmium sulfate, RP1389
- Meteorograph, improved radio, for upper-air measurements, RP1169
- Meteorological conditions, effect on radio transmission, S476
- factors, automatic remote measurement, RP1318
- Meter, definition, S535
- frequency, for use with Geiger-Müller counter, RP1627
 - prototype, recomparison, S1
 - provers, inspection and testing, T114
 - rotary displacement, tests, RP335
 - superheat, for airships, T359
 - Venturi, tests, RP335
- Meter-kilocycle conversion table (chart), M67
- Meters, electric, C20, C56
- flow, for air, T183
 - gas, C309
 - gas, saturation and tilting errors, RP1238
 - gas, testing, RP1741
 - watt-hour, direct-current, S207
- Methane, heat of combustion, RP260, RP343
- thermodynamic properties, RP1634
- Methyl glycosides, lyxose, mannose, and gulose, RP1274
- optical rotation of carbon atoms, RP128
- Methyl- α -glucosides, preparation, RP396
- 2-Methylbutane, heat of combustion, RP1193
- Methylcyclopentane, isolation and properties, RP375
- Methylfurfural, formation from methylpentoses, RP1233
- 2-Methylheptane, isolation from petroleum, RP552
- 2-Methylhexane in petroleum, RP542
- Methylisopropylcarbinol, action of sulphuric acid, RP740
- Methyloctanes, separation from petroleum, RP1033
- Methylpentanes, determination in petroleum, RP311
- Methylxyloside, structure, RP93
- Metric carat, C43, M3
- chart, M3
 - manual for soldiers, M21
 - system, S17, C47, M2, M3, M21, M121, M135
 - units of weight and measures, C47, M121
- Mica condensers as standards of capacity, S137
- effect of heat treatments, RP347, RP1675
 - effect on clay, and supplementary data, RP1311
 - electrical properties, RP347
 - ruby, color standard, RP1671
- Microburette for testing absorbent paper, RP959
- Micrometer, electrically controlled, RP528
- gages for rubber, RP549
- Micrometers, dial, T226
- Microphone, ribbon and pressure, use in measuring sound transmission, RP1388
- Microphones, absolute-pressure calibrations, RP-1341
- Microphotometer for photographic densities, S385
- Micropyrometer, S198, S242
- Microscope systems, aberration of apochromatic, RP316
- Microscopes, micrometer, S215
- Microscopic examination of cotton fibers, RP1309
- identification of crystalline compounds, RP829
 - identification of fibers, T250, C423
 - structure of cotton fiber, RP1362
- Microscopy of metals, C113
- Mildew, effect on vegetable-tanned strap leather, RP1713
- Milk, fluid, cans for, R208
- Milk bottles, M85
- caps, R10
- Millboard, asbestos, R19
- Millinery-boxes, folding, stock, R173
- Milling cutters, R36
- Millivoltmeters, temperature compensation, RP926

- Mineral aggregate production screens, wire diameters, R147
lubricating and transformer oils, evaporation test, T13
oils, carbonization, T4
oils, high-boiling, S160
oils, thermal properties, M97
spirits for thinning paints, specification, C98
Mineral wool insulation for heated industrial equipment, CS117
low-temperature installations, CS105
products, industrial, all types — testing and reporting, CS131
Minerals and their products, non-metallic, standards and specifications, M110
Minimum design loads, American Standard Building code requirements for, in buildings and other structures, M179
Minimum-deviation refractometry, RP1572
Mining, electrical practice in, C23
Mirrors, CS27
dental cone-socket, R137
production, C389
Model tests, wind pressure, RP545
Modeling clays, crayons, and chalks for school use (types, sizes and packaging), R192
Models, vehicle, wind-tunnel measurements, RP-748, RP749
Modulator tube, operation in radio telephone sets, S423
Moduli, temperature coefficient of elastic, RP531
Mohair pile fabrics, CS52
Moist fabrics, chilling effect, RP1587
Moisture absorption by gas-cell fabrics, RP818
barriers, apparatus for determining water-vapor permeability of, C453
content measurement (press cloth), T231
content of air in houses, BMS56
content of paper, RP633
effect on leather, RP1319
relations of textile fibers at elevated temperatures, RP1303, RP1304
walls, BMS63, BMS93
Molasses, density determined by picnometer, T161
recovery of by-products, C145
temperature corrections of Baumé hydrometers, C295
weight per gallon, T345
Mold conditions and deoxidation of steel castings, RP199
Molding, interior, hardwood, CS76
sand, fineness tests, RP757, RP1720
Molds, ice-cream, brick, R120
Molecular chain length as related to the mechanical properties of cellulose, RP1513
distillation, apparatus for, RP1739
still, RP1739
weight of hydrocarbon mixtures, RP236
Molecular weights, determination for vapors at low pressures, RP53
improved Victor Meyer apparatus, RP215
nonvolatile petroleum fractions, determination, RP772
Mollier chart of properties of ammonia, M52, M57, M76
diagram, steam, S167
Molybdenite, chemical analysis, S462
optical electrical and photoelectric properties, S322, S325, S338, S398, S462, S486, S493
Molybdenum, determination, RP453
microstructure, S488
reflecting power, S152
separation from rhodium, RP1248
separation from aluminum, RP86
spectrum, S372, S474
steel, etching methods and solutions for, S518
thermal expansion, S332, S488
Monel metal, C100
creep rates, RP1462
reflecting power, S379
stress corrosion pitting, RP1366
thermal expansion, S426
Monoazo dyes, spectral absorption, RP47
Monochromatic light sources, S44
Monolithic concrete walls, nonreinforced, structural properties, BMS61
Monoolefin hydrocarbons, determination of and separation from paraffins, naphthenes, and aromatics by adsorption, RP1652
method for calculating properties, RP1651
Monoolefins, thermodynamic properties, RP1738
Mooney viscometer, factors affecting results obtained with, C451
Mooring spindle of airship, T270
Mopsticks, CS2
Mortar, adhesion to brick and steel, RP504
cement-lime, T308
masonry, ten year compressive strength and linear change, RP1548
refractory, air-setting, dry type, RP1461
strength of, T3, T5, T111, T276, T308, T311
Mortar and brick, durability and strength of bond, RP290, RP683
Mortars, cement, high early strength, RP799
effect of cement size on properties, RP777
lime, properties, RP952
masonry, RP290, RP683, RP746, RP952
plasticity, T169, RP839
portland cement, T3, T5
refractory, heat-setting, RP1534
vibrators in determining properties, RP1273
wet type, air-setting refractory-bonding, RP1219
Mosaic, unglazed ceramic, R61
Mosquito netting, specification, C359
Mother of pearl, transmissive properties, T369
Motion picture film for permanent records, M144, M154, M158, M162
Motion-picture projectors, C437
acoustic performance, C439
Motor fuels, substitute, RP1660, RP1673, RP1681, RP1698
thermal expansion, RP393
volatility, RP694
Motor and controller parts, electric railway, packaging, R145
Motor-truck wheels, physical tests, T150
Mugler, Herman A., "Mu-Steel" constructions, BMS67
Mullen test for paper, RP278
"Multiple Box-Girder Plywood Panels" for walls, floors, and roofs, structural and heat-transfer properties, BMS99
"Munlock Dry Wall Brick" walls, structural properties, BMS53
Munsell color system, T167
book of color, tristimulus specification, RP1549
Munson and Walker reducing-sugar method, RP1301, RP1417
Muntz metal, deterioration by corrosion, T103
failure by cracking, S321
"Mu-Steel" sheet-steel constructions for walls, partitions, floors, and roofs, structural properties, BMS67
Mutarotation, β -D-2-deoxygalactose, RP1190
effect of hydrogen-ion concentrations, RP1104
 α -D- α gulohexose, RP1052
lead aldolates, RP770
 α -D- β mannoheptose, RP1069
mannuronic lactone, RP1727
l-sorbose, RP1035
xylose, RP723
Mutarotation and ring structure of mannuronic lactone, RP1727
Mutual inductance, *see* Inductance.

N

- Nails, small cut, R47
wire, R223
wire, copper, R150
Naphthalene, heat of combustion, S230
solidification point, S340
Naphthene hydrocarbons, separation from paraffin hydrocarbons, RP967
 β -Naphthoquinonesulfonic acid, spectral absorption, RP1424
National Concrete Masonry Association, wall constructions, BMS21, BMS32
National Conference on Weights and Measures. Index of reports on first to thirty-first Conferences, M172
National Conference on Weights and Measures, Reports:
First, 1905, M4
Second, 1906, M5
Third, 1907, M6
Fourth, 1908, M7
Fifth, 1910, M8
Sixth, 1911, M9
Seventh, 1912, M10

(Continued on next page)

- Eighth, 1913, M11
 Ninth, 1914, M12
 Tenth, 1915, M13
 Eleventh, 1916, M14
 Twelfth, 1919, M41
 Thirteenth, 1920, M43
 Fourteenth, 1921, M48
 Fifteenth, 1922, M51
 Sixteenth, 1923, M55
 Seventeenth, 1924, M59
 Eighteenth, 1925, M70
 Nineteenth, 1926, M74
 Twentieth, 1927, M80
 Twenty-first, 1928, M87
 Twenty-second, 1929, M101
 Twenty-third, 1930, M116
 Twenty-fourth, 1931, M129
 Twenty-fifth, 1935, M156
 Twenty-sixth, 1936, M157
 Twenty-seventh, 1937, M159
 Twenty-eighth, 1938, M161
 Twenty-ninth, 1939, M164
 Thirtieth, 1940, M167
 Thirty-first, 1941, M170
 Thirty-second, 1946, M186
 National Conference on Weights and Measures, specifications, tolerances and regulations for weighing and measuring devices, M85, H22, H29
 National directory of commodity specifications, M65, M130, M178
 electrical safety code, C54, C72, H3, H4, H6, H7, H8, H9, H10, H31, H32, H33, H34, H35, H36, H39
 safety code for head and eye protection, H2, H24
 Screw Thread Commission, progress report, M42, M61, M89, M141
 screw threads, American, CS22
 Natural gas, analysis, RP1759, RP1789
 burners, carbon monoxide from, T212
 domestic gas appliances, C116
 gasoline content, RP75
 Navigation instruments, (aircraft), T237
 radio aids, (*See* Radio)
 Neckyokes, R134
 Needles, dental hypodermic, R108
 hypodermic, medical and surgical (for hospital use), R224
 Nelson Cement Stone Company's "Nelson Pre-Cast Foundation" wall construction, structural properties, BMS26
 Neodymium, spectra, S442
 spectrophotometric determination, RP1395
 Neolactose, derivatives of, RP1429
 Neon, infrared spectrum, RP540, RP781
 interference measurements, RP710
 light, visibility, RP78
 spectrum, S179, S191, S251, S329, RP540, RP1061
 Neopentane, heat of combustion, RP1193
 Neoprene G, permeability to hydrogen, RP1327
 permeability to gases, RP1166
 Nernst glower, S91
 Netting, mosquito, specification, C359
 woven wire, CS133
 Neutrality, chemical, test for, S178
 Neutron sources, radium-beryllium, absorption of gamma rays in, RP1257
 Newspaper records, preservation, M145
 Nick-bend test for wrought iron, T252
 Nickel, absorption spectrum, S551
 corrosion tests, T367
 determination in dental gold alloys, S532
 effect in storage batteries, RP1335
 effect of sulphur upon properties, T281
 elastic properties, RP1459
 etching reagents, S435
 malleability and metallography, T281
 melting point, RP258
 oxide, emissivity, S224
 plating, exposure tests, RP712, RP1293
 plating on steel, RP1725
 plating, thickness measurements, RP994
 pure, physical properties, RP257, RP258
 reflecting power, RP39
 spark-plug electrodes, T143
 spectrum, S324, S551, RP4
 steel, properties, C58, C100
 steels, critical ranges, S376
 steels, thermal analysis, S376
 thermal expansion, S426
 Nickel and chromium plating on steel, tests, RP724
 Nickel and nickel alloys, C100
 Nickel-chromium alloys, thermal expansion, RP388
 Nickel-chromium-iron alloys, heat resisting, RP572
 Nickel-copper alloy, corrosion tests, T367
 creep rates, RP1462
 Nipples, pipe; brass, copper, steel, and wrought-iron, CS5
 Nitrates and nitrites in battery acid, T149
 Nitric acid, pressure of, RP1521
 Nitriding iron and steel, RP126
 steels, determination of aluminum, RP533
 Nitrogen, ionization and resonance potentials, S400
 iron and steel, S457
 metals, determination by fusion in vacuum, S563, RP346
 spectral classifications, S490
 standard-sample steels, RP494
 Nitrogen-iron system, RP126
 Nitrosite method for rubber determination, T35, T145
 Nitrous oxide, vapor pressure, latent heat of vaporization, and triple-point temperature, RP1644
 Noble gases, infrared spectra, RP781
 Noise prevention in buildings, (*see also* Acoustics), T337
 Nomographs for stresses from strain data, RP1034
 Nonanaphthene, properties, RP745
 Nonanes, purification, purity, and freezing points, RP1760
 Nonflammable liquids for cryostats, S520
 Nontronite, synthesis, RP819
 Nonyl bromide, synthesis and physical constants, RP482
 Normal coordinate analysis of olefins, RP1768
 Notched bar tests, T289
 Notes, drafts, bank checks, R50
 Nuclear energy levels, cobalt, RP1778
 scandium⁴⁶, RP1781
 Nut locks, torque on, RP386
 Nuts, plain and lock, RP386
 standard proportions, M89
 Nuts and bolts, note on the electrical resistance of contacts between, RP227
 stock-production sizes, R169
 tensile properties, RP763
 Nylon, electrophoretic studies, RP1376
 Nylon and sisal rope, impact strength, RP1679

O

- Objectives, photomicrography of paper fibers, T217
 resolving power, S122
 Ocean temperatures, S210
 Ocher, specification, C91
 Octane number, determination at altitude, RP1475
 separation from petroleum, RP282
 (2,2,4-trimethylpentane), freezing point, RP469
 Octanes, free energies and equilibria of isomerization, RP1641, RP1650
 heats of isomerization, RP1635, RP1642
 purification, purity, and freezing points, RP1752
 Odometers, specifications and tolerances, M129
 Offset lithography, RP480
 paper, moisture expansion, RP1054
 papers, beater practice in manufacture, RP1455, RP1532
 Ofner's method for invert sugar determination, RP1757
 Ohm, absolute determination, RP857, RP1137, RP1606
 international, changes in, C459
 international, standard resistors for maintenance, RP1692
 mercury, S102, S256, M16
 Ohm's law, RP1323
 Oil burners, mechanical, automatic, CS75
 determination in varnish, T65
 linseed, affected by pigments, T71
 linseed, density and thermal expansion, T9
 linseed, infra-red spectral transmission, S168, S418
 linseed, iodine number, T37
 linseed, specifications, C82, C330, C361, C362
 lubricating, extraction with acetic acid, RP1067
 resistance to emulsification, T86
 salad and cooking, and shortening, packaging, R193
 sulphonated, effect on leather, RP811

- Oil-burning floor furnaces equipped with vaporizing pot-type burners, CS113
space heaters, CS101
- Oilcloth, table, white, specification, C357
- Oils, automobile cylinder, oxidation, T73
effect of mechanical working on consistency, RP188
fuel, domestic and industrial, CS12
interfacial tension, T223
lubricating, action of sunlight and air, S153, T4
lubricating, carbonization, C99, T4
lubricating, chemical constitution and properties, RP849
lubricating, measurement of boiling points, RP796
lubricating, reclamation, T223
lubricating, testing, M15, T223
mineral, high-boiling, S160
mineral, lubricating and transformer, evaporation test, T13
organic, acidity, T223
petroleum, compressibility and thermal expansion, RP244
petroleum, density and thermal expansion, T77, C57, C59, C154, C410
petroleum, oxidation, S153, S160, T4, T73, C99
petroleum, standard tables, C57, C59, C154, C410
petroleum, sulphur content, T177
petroleum, thermal properties, M97
slushing, T176, C200
sulfonated, grading, CS43
used petroleum, reclamation, T223
vegetable, color and spectral transmittance, RP815
- Olefin hydrocarbons, heats, equilibrium constants, and free energies of formation, RP1722
heats of combustion and formation, RP1028
heats of formation, hydrogenation, and combustion, RP1702
- Olefins, polymerization, RP740
vibrational frequencies, RP1768
- Olive containers, glass, R196
- Olive drab paint, specification, C165
- Olivine as a refractory, RP645
- Olland-type radio telemeter, RP1169
- Opacity, paper, RP660
standards, RP709
- Optical design, application of aberration equations, S550
glass, annealing and heat treatment, S572
glass, attack on refractory clay pots, RP1689
glass, gases in, RP1014
glass, refractive index, RP1572, RP1575, RP1659
glass, striae, S333, S373
glass, surface tensions, RP1771
glass, viscosity, RP577
glasses, serviceability, RP1706, RP1719
instruments, testing and properties, RP984, C27, C428
method for evaluating finish, RP1625
properties of materials, C28
pyrometry, S11, S121, T170, RP65, RP258, RP326, RP568, RP676, RP1189
specification of light-scattering materials, RP-1026
systems, aberrations, RP466
- Optical rotation, derivatives of mannose, RP392
 β -D-2-desoxygalactose, RP1190
dextrose, S293
fucose, S459
glucosides, RP1601
glycosides, RP1399
D-gulose, effect of CaCl_2 , RP226
liquids, M118
methyl glycosides, RP1274
l-sorbose, RP1035
sucrose, S52, S268, RP916
sugar derivatives, RP1429, RP1497, RP1547, RP1555, RP1576
sugars, derivatives, quartz, etc., C429
- Optical rotation and atomic dimensions, RP358, RP978
- Optical rotation and atomic dimension of active amyl alcohols, RP1551
- Optical rotation and structure in the sugar group, S533, RP128, RP253
- Orange shellac, specifications, C302
- Ore analysis, S186, T8, C26
- Ores, iron and manganese, analysis, C26
specifications for, M120
- Organic acids, volatile, determination in sulfuric acid, RP267
compounds, heats of combustion, RP41
substances, optical rotation, M118
Orifice meters, T183, RP459, C309
Orifices, experiments on, RP49, RP335
gas, contraction coefficients of jets, RP303
Orthoacetates of sugars, RP1429
- Oscillations, damping in a mass of mercury, S289
electrical, damped, S95, S140, S158, C74
electrical, in antennas, S157, S326
electrical, in ignition apparatus, S543
electrical, in inductance coils, S326
high frequency from electric arc, S60
laminar boundary layers, RP1772
piezo-electric, RP156
undamped, from electron tube generator, S355, C74
- Oscillator, piezo, 200-kilocycle, for radio frequency control, RP576
- Oscillators, synchronization, RP1780
- Oscillators, piezo, design of portable temperature-controlled, RP153
use in obtaining accurate time intervals, RP1136
use in radio-frequency measurements, RP630, RP759, RP925
- Oscillograph, cathode-ray, RP460, RP636
cathode-ray, for frequency standardization, S489
measurements in automobile battery circuits, T186
use in measurement of electrode potentials, S504
- Osmium, atomic weight, RP471
radiation constant, S105
separation and determination, RP286
spectrum, S499
- Overall elastic webbing, CS58
- Overfiring, effect upon clays, T22
- Over-reduced steel, RP250
- "Overshoot" phenomenon in tantalum and tin, RP977
- Oxalate, sodium, as standard in volumetric analysis, C381
- Oxidation, aldoses by bromine water, RP82
automobile cylinder oils, T73
cellulose with periodic acid, RP1491
detection in wool, RP1089
galacturonic acid and of 5-keto-gluconic acid in alkaline solution, RP1680
petroleum oils, S153, S160, T4, C99
steels, determination from interference colors, RP1221
sugars, RP969, RP990, RP1497, RP1547, RP-1573
sugars, electrolytic, RP328
sugars with bromine water, RP534
sulfur dioxide in brick kilns, T370
wool, RP875, RP876, RP904, RP928, RP998
xylose, RP773
- Oxide additions, effect of thermal length changes of zirconia, RP1662
films, elimination on metals, RP1468
inclusions in steel, RP346
- Oxides, emissivity, S224, S242, S243
refractory, melting points, S212
- Oxidimetry, indicators, S178
sodium oxalate standard, S182, C40, C381
- Oxyacetylene welding and cutting blowpipes, T200
- Oxygen, analytical absorption, RP177
atomic weight in air and in water, RP932
bomb, aging of leather, RP1128
content of acid Bessemer steels, S346
determination by chromous chloride and by chromous sulfate, RP1112, RP1113
determination by vacuum fusion, S514, RP346
determination in cast iron, by hydrogen-antimony-tin method, RP25
determination, in iron and steel by Ledebur method, T118, S350
determination, in simple and alloy steels, RP-1114, RP1115
determination in steels, S350, RP976
effect on leather, RP1004, RP1319
effect on red shortness of iron, T261
heat capacities, RP1804
high purity, preparation, RP1182
ionization and resonance potentials, S400
isotopic fractionation, RP729, RP820
point apparatus, RP1339

(Continued on next page)

solubility in benzoic acid, RP1647
 steel, RP606
 thermodynamic properties, RP1634, RP1747
 variation of intrinsic energy with pressure, RP503
 Ozaphane film, stability, RP1134
 Ozone, distribution in stratosphere, RP1207, RP1367

P

Package sizes, insecticides and fungicides, R41
 Packages, salt, R70
 shortening, salad oil, and cooking oil, R193
 standardization, M165
 Packaging, agricultural insecticides and fungicides, R41
 air brake (electric railway) parts, R162
 automotive (bus) engine parts, R161
 clothespins, R188
 crayons, chalks, and modeling clays for school use, R192
 dental plaster, investment, and artificial stone, R117
 electric railway motor and controller parts, R145
 extracted honey, R156
 first-aid unit dressings and treatments, R178
 flash-light batteries, R104
 glass containers for olives, R196
 household insecticides, R203
 maraschino cherries, R197
 overhead electric railway material, R65
 peanut butter, R209
 razor blades, R69
 salt, R70
 toiletries and cosmetics, R200
 woven-wire fencing, R9
 Packing, asbestos, specifications, C238, C241, C243, C334
 carriage, machine, and lag bolts, R60
 flax, specification, C239, C363
 hard fiber sheet, specification, C335
 low-pressure spiral gland, specification, C237
 materials, water-vapor permeability, M127
 rubber, specifications, C234, C235, C236, C240
 tucks, specification, C233
 Packings and gaskets, rubber, specification, C235
 Pads, surgical operating, specification, C245
 Paint and painting, general information, T274, C69, BMS105
 Paint and varnish brushes, R43
 Paint, black, specification, C94
 composite thinner for, specification, C102
 dryer, liquid, specification, C105
 fading rate, RP1478
 flat interior lithopone, specification, C111
 gloss interior lithopone, specification, C147
 green, specification, C97
 hiding power, T306
 iron oxide, and iron-hydroxide, specification, C93
 manual with particular reference to Federal Specifications, BMS105
 olive drab, specification, C165
 priming plaster surfaces, M137
 protective value against corrosion of steel, BMS8
 specifications, applicability of, T274, BMS105
 tests, accelerated, RP1
 titanium-zinc, specification, C215
 white, specification, C89
 Painting, plain or galvanized sheet steel, BMS44
 steel, BMS102
 Paints, cement-water, and other water-proofings for
 unit-masonry walls, tests of, BMS95
 emissive tests, T254
 oil, artists', CS98
 traffic or zone, properties, RP1007
 tests, C45, M15
 varnishes, and related products (shades and contain-
 ers), R144
 Pajama sizes, boys' (woven fabrics), CS106
 men's — woven fabrics, CS15
 "Palisade Homes" constructions, structural proper-
 ties, BMS37
 Palladium, analytical separation, RP655
 effect on determination of iridium, S483
 melting point, S55, RP65
 reflection, S45
 separation of osmium, RP286
 spectrum, S499
 Paneling, wall, hardwood, CS74

Paper, aging, natural and accelerated, RP620
 RP1241
 air permeability, RP681, RP682
 artificial aging of, RP107, RP352
 asbestos, R19
 bags for cement and lime, T187
 bags, (for notions and millinery), for depart-
 ment and specialty store use, R129
 bags, grocers, R42
 book, effect of fiber components on stability, RP949
 boxes, set-up (for department and specialty
 store use), R126, R127
 boxes for toiletries and cosmetics, R200
 bulk, RP69
 bursting strength test, RP278
 coating, T323, RP254
 color of white, T244
 condensers, electrical, S166, S190
 cones and tubes (for textile winding), R143
 copper number, T354, RP295
 curl of, RP1522
 currency, experimental production, T329, RP121
 currency, wearing quality, RP1701
 deterioration, M128, M140, M142, M144, M154, RP407, RP620
 determining pore size, RP1292
 effect of humidity on properties, C445
 effect of inks on aging, RP779
 effect of sizing on properties, RP372
 fibers, T250
 fiber-water mixtures, pH changes in heating, RP1262
 fillers, comparative study, T301
 fillers, use of clay, T262
 filter, air permeability and speed, RP1613
 folding tester, calibration and adjustment, T357, C379
 from cornstalks, M147, M148
 from wood fibers, RP107, RP372
 grocers' bags, R42
 insects, control, RP288
 measurement of sizing, T326
 micrometers for measuring thickness, T226
 moisture content and dimensions, RP633
 moisture expansion, RP1054
 newsprint, deterioration, M145
 offset printing, RP730
 offset, treatment and properties, RP859
 opacity, RP660
 permanence of, RP107, RP349, RP372
 photographic, R98
 preservation, M128
 protection with cellulose acetate sheeting, M168
 pulp, production from cereal straws, M124
 pulp, T88, T189
 resin content, RP973
 sheet sizes, R22
 shipping tags, R93
 shot shells, loaded, R31
 stock recovered from waste paraffin paper, T87
 sulfite, strength and stability, RP1574
 sweet-potato starch for sizing, M150
 testing, T194, C45, C107, RP295
 -testing microburette, RP959
 tissue, R46
 tissue; waxed, R125
 towels, C294, C407
 tracing, transparency, C63
 tubes for packaging milk-bottle caps, R218
 wall, CS16
 war map, experimental manufacture, RP1751
 water-vapor permeability, M127
 wear test, RP1390
 Papers and pulps, determination of cellulose, RP979
 pentosans in, RP1199
 volumetric determination of alpha-, beta-, and
 gamma-cellulose, RP1068
 Papers, book, effect of filling and sizing materials
 on stability, RP1149
 book, printing tests, RP1180
 building and sheathing, RP85
 for blind readers, RP690
 filter, evaluation, RP1653
 offset, beater practice in manufacture, RP1455, RP1532
 pH values, RP1205
 photochemical stability, RP1517
 (Continued on next page)

rag-fiber, stability, RP794
 sheathing, stability, BMS35
 waterproofed case-lining, T312
 Papermaking material, carofa fiber, T340
 properties of phormium tenax (New Zealand flax), RP285
 properties of rayon, RP143
 properties of wood fibers, RP107, RP372
 Paper-sizing materials, rosin, light sensitivity, RP307
 Parachute webbing, dynamic tests, RP1710
 Parachutes, air permeability of fabrics, RP261
 Paraffin, heat content, M97
 hydrocarbons, heats, free energies of, RP1642
 hydrocarbons, heats of combustion, RP966, RP1607
 hydrocarbons, heats of combustion and formation, RP1642, RP1650
 hydrocarbons, isolation from crude synthetic isooctane, RP1027
 hydrocarbons, method for calculating properties, RP1651
 hydrocarbons, purification, purity, and freezing points, RP1760
 hydrocarbons, separation from naphthene hydrocarbons, RP967
 hydrocarbons, vapor pressures and boiling points, RP1670
 naphtha cleaning method, T360
 recovered from waste paraffin paper, T87
 solidification point, S340
 Paraffined paper condensers, S166
 Paraffins, *n*-nonane from petroleum, RP383
 Particle size and plasticity of lime, RP1232
 determination by sedimentation, RP642
 Partition method for determination of boron, RP-1401
 Partitions, fire tests, RP1076
 metal, for toilets and showers, R101
 structural properties, BMS11, BMS12, BMS-18, BMS31
 wood-frame, and wood-plank, structural properties, BMS37
 wood-frame, structural properties, BMS25, BMS36, BMS42, BMS47, BMS48
 Paschen's method of equal ordinates, S162
 Patents on powder metallurgy, M184
 Patterns, dress, CS13
 foundry, of wood, CS19
 Paving, asphalt, R4
 brick, vitrified, R1
 Peanut butter packages and containers, R209
 Peas, canned, sieve sizes, R149
 Pectic acid, preparation of galacturonates from, RP1617
 enzymes, use in the analysis of plant materials, RP1616
 substance in cotton fibers of various ages, RP1326
 substance, solubility in cuprammonium hydroxide solutions, RP1299, RP1309
 substances, preparation of galacturonic acid from, RP1576
 substances, preparation of vitamin C from, RP1594
 Pectin, acidic properties, RP1313
 preparation of *d*-galacturonic acid from, RP-1325
 Pedestals, welded steel, stress distribution, RP232
 Pendulum, time of swing of reversible, RP444
 Pentane lamp, S216
 normal, heat of combustion, RP686
 Pentanes, free energies and equilibria of isomerization, RP1440
 Pentanol-2 and halogen derivatives, boiling point, optical rotation, and refractive index, RP1551
 Pentenes, purification, purity, and freezing points, RP1752
 Pentosans, determination, RP398
 in pulps and papers, RP1199
 Pentose, optical rotation of carbon atoms, RP128
 Pentoses, formation of furfural from, RP1233
 volumetric determination, RP398
 Peptide and amide bonds in proteins, catalyzed, analysis, RP1503
 Percal, specification, C366
 Perchloric acid, volatilization of metallic compounds by, RP1198

Perforated cover plates, axial rigidity, RP1737
 cover plates for steel columns, RP1473, RP-1474, RP1501, RP1514, RP1527, RP1540
 tension members, axial rigidity, RP1568
 Periodic acid, oxidation of cellulose with, RP1491
 acid oxidation of difructose anhydrides, RP-1683
 variable, function of, read by instrument, S90
 Permanence of paper, RP107
 of records, M128
 Permanganate solutions, standardization, RP843
 Permeability, air, of fabrics, RP261, RP1471, RP1589
 balloon fabrics, T113
 magnetic, RP714
 magnetic, temperature coefficient, S245
 of bricks to water and air, RP1349
 of concrete, RP394
 of elastic polymers to hydrogen, RP1327
 of masonry walls, BMS7, BMS41, BMS55, BMS76, BMS86
 of membranes to water vapor, M127
 of moisture barriers, apparatus for determining, C453
 of Neoprene to gases, RP1166
 of organic polysulphide resins to hydrogen, RP1020
 of paper to air, RP681, RP682
 of Portland cement mortars and concretes, T3
 of priming coats on floor coverings, BMS59
 of resin finishes to moisture, RP974
 of "Speedbrik" wall construction, BMS86
 of stone, T305
 of stucco-faced, gunite faced, and "Knap-Concrete-Unit" walls, BMS94
 of synthetic films to hydrogen, RP750
 of walls to water vapor, BMS63
 Permeameter, Fahy, S306
 Fahy simplex, RP174
 high-H, for magnetic testing, RP1242
 Koepsel, S228
 magnetic hysteresis, RP845
 Permeameters, magnetic standards for testing, RP140
 standardization at high magnetizing forces, RP279
 Personnel, positions at National Bureau of Standards, M94, M152, M163
 Persulphate-arsenite method for manganese, RP109
 Petroleum, chemical composition, RP45, RP280, RP360, RP432, 438, 458, 501, 542, 554, 614, 745, 808, 817, 824, 849, 943, 953, 955, 1033, RP1122, 1123, 1142, 1143, 1145, 1173, 1174, 1184, 1289, 1423
 determination of benzene, RP311
 determination of methylpentanes, RP311, RP375
 determination of molecular weights of some compounds, RP215
 determination of 2,3-dimethylbutane, RP311
 1,1-dimethylcyclopentane and 2-methylhexane in, RP542
 dimethylpentane in, RP458
 distillate between 115° and 124° C, hydrocarbons, RP943
 distillation, RP379
 effect of heat on cracking, RP45
 ethylcyclohexane in, RP317
 extraction apparatus, RP311
 extraction of xylenes, RP501
 fractionation of, RP943, RP953, RP954, RP-955, RP967, RP1122, RP1123, RP1142, RP1143, RP1144, RP1145, RP1173, RP1174, RP1184, RP1185, RP1289, RP1296
 fractionation by azeotropic distillation, RP-1402
 fractionation of 1,2,3,4-tetramethylbenzene, 5,6,7,8-tetrahydronaphthalene, 1-methyl-5,6,7,8-tetrahydronaphthalene, and 2-methyl-5,6,7,8-tetrahydronaphthalene, RP1423
 fractions, nonvolatile, molecular weights, RP772
 hydrocarbons, crystal behavior, RP1000
 hydrocarbons in, RP1800
 hydrocarbons in the gasoline fraction of, RP1571
 hydrocarbons, isolation, RP824

(Continued on next page)

- hydrocarbons, separation, with silica gel, RP809
- isolation of ethylbenzene, RP554
- isolation of hexanes, RP239, RP311, RP360
- isolation of naphthenes, RP1296
- isolation of normal decane, RP438
- isolation of normal nonane, RP383
- methylcyclopentane in, RP375
- near infrared absorption of hydrocarbons, RP1017, RP1072
- nonanaphthene in, RP745
- oils, chemical constitution, RP849
- oils, compressibility and thermal expansion, RP244
- oils, density and thermal expansion, T77
- oils, iodine number, T37
- oils, oxidation, S153, S160, T4, T73, C99
- oils, standard tables, C57, C59, C154, C410
- oils, sulphur content, T177
- products, thermal properties of, M97
- separation of dimethylcyclohexanes, RP808
- separation of methylcyclohexanes, RP1033
- separation of normal octane, RP282
- toluene in, RP280
- "Pfeifer Unit" wall construction, structural properties, BMS39
- pH of acid potassium phthalate, RP1690
- acid potassium phthalate with or without potassium chloride, RP1586
- borate-chloride buffers, RP1609
- buffer solutions, RP1632
- criterion of leather deterioration, RP761, RP1109
- curves of acid mixtures, RP889
- effect of, on absorption spectra, RP1686
- effect on strength of resin-bonded plywood, RP1748
- measurement in alkaline cyanide copper plating baths, RP1291
- p*-phenolsulfonate buffers, RP1559, RP1567, RP1580
- phosphate buffers, RP1648
- range of potassium *p*-phenolsulfonate, RP1558, RP1559
- response of glasses, RP1719
- response of potash-silica glasses, RP1743
- standards composed of phosphate salts, values of, RP1524
- standards, use of phenolsulfonate as, RP1558, RP1559, RP1567
- titration curves of formic and acetic acids, RP1537
- titration curves of malonic acid, RP895
- unknowns, determination, RP1580, RP1586
- values of acid-salt mixtures of *p*-phenolsulfonic acid and of 4-chlorophenol-2-sulfonic acid, RP1567
- values of metacresolsulfonophthalein, RP1569
- values of mixtures of *o*-phthalic acid and potassium hydroxide, RP1678, RP1687
- values of papers, RP1205
- PHC Housing Corporation, structural properties of "PHC" prefabricated wood-frame constructions for walls, floors, and roofs sponsored by, BMS90
- Pharmaceuticals and drugs, color names, RP1239
- Phase angle of transformers, S116, S130, S164, S211, S217, S233
- difference, condensers, S64, S166, C36
- difference of electrical insulating materials, S471, T216, T284
- difference of harmonics, effect upon acoustic quality, S127
- Phase equilibria, system $\text{CaO-Al}_2\text{O}_3\text{-Fe}_2\text{O}_3$, RP987
- $\text{CaO-Al}_2\text{O}_3\text{-H}_2\text{O}$, RP1539
- $\text{CaO-B}_2\text{O}_3$, RP510
- $\text{CaO-B}_2\text{O}_3\text{-SiO}_2$, RP941
- $\text{CaO-Fe}_2\text{O}_3\text{-SiO}_2$, RP1340
- $\text{CaO-Na}_2\text{O-Al}_2\text{O}_3$, RP414
- $\text{Cr}_2\text{O}_3\text{-Al}_2\text{O}_3$, RP317
- $\text{Cr}_2\text{O}_3\text{-SiO}_2$, RP203
- $\text{K}_2\text{O-PbO-SiO}_2$, RP911, RP1392
- $\text{Na}_2\text{O-TiO}_2$, RP648
- $\text{PbO-B}_2\text{O}_3$, RP995, RP1392
- $\text{PbO-B}_2\text{O}_3\text{-SiO}_2$, RP1231
- PbO-SiO_2 , RP705
- portland cement, RP1570
- $\text{SiO}_2\text{-ZnO}$, RP136
- $\text{SiO}_2\text{-ZnO-Al}_2\text{O}_3$, RP413
- TiO_2 , $\text{TiO}_2\text{-SiO}_2$, $\text{TiO}_2\text{-Al}_2\text{O}_3$, RP619
- Phase equilibrium of CaO , MgO , Al_2O_3 , SiO_2 , RP884
- studies of cement, RP1421
- studies on portland cement, RP1699
- studies of potash compounds of portland cement, RP1512
- system; lead acetate, lead oxide, water at 25°, S232
- Phenol, addition agents in copper electrotyping solutions, RP228
- glycosides, enzymatic hydrolysis, RP1369
- Phenolic disinfectant, emulsifying type, CS70
- disinfectant, soluble type, CS71
- insulating materials, S352, T216, T284
- p*-Phenolsulfonate buffers, pH, RP1559, RP1567, RP1580
- Phenolsulfonate buffers, salt effects on, RP1746
- Phormium tenax (New Zealand flax), papermaking properties, RP285
- Phosphate buffers, pH of, RP1648
- pretreatment of steel for painting, BMS102
- Phosphate rock, analysis, RP1095
- determination of magnesia, RP484
- determination of phosphorus, RP1010
- Phosphomolybdate precipitate in determination of vanadium, T8
- Phosphorescence of plants and animals, S538
- Phosphorescent materials, photometer for measuring, RP1646
- Phosphoric acid, second dissociation constant, RP1524
- Phosphorus, colorimetric determination in steel and cast iron, RP1386
- determination in phosphate rock, superphosphate, and "metaphosphate", RP1010
- in low-carbon, open-hearth steel, T203
- in steels containing vanadium, T24
- in wrought iron, T97
- ionization and resonance potentials, S400
- peroxide, heat capacity, and heat sublimation, RP514
- spectrum, RP425
- Photocell, barrier-layer, photometry, RP1348
- Photochemical decomposition of cystine in wool, RP1255
- silk, effect of pH, RP395
- decomposition, textiles, RP697
- Photochemical reactions in silk, RP1404
- reactions in wool, RP1091
- Photochemical stability of papers, RP1517
- study of sheet materials, apparatus for, RP1300
- Photoelastic determination of stresses around a circular inclusion in rubber, RP1083
- Photoelectric amplifier, ultraviolet intensity meter, RP647
- cell as radiometer, S319
- cell thermoregulator, RP284
- cells, barium, S462
- dosage-intensity meter, RP858
- investigations, S319, S322, S338, S344, S380, S398, S446, S451, S456, S462
- measurement of cloud heights, RP1379
- reflectometer, RP1345
- spectrophotometry by null method, S349
- "Photo finish" at the race track, RP986
- Photogrammetric mapping, camera errors, RP1177
- Photographic developers and sensitivity, RP598
- densities, microphotometer for, S335
- emulsions, RP20, RP173, RP340, RP376, RP430, RP447, RP525, RP622, RP646, RP659
- emulsions, mechanism of hypersensitization, RP525
- emulsions, sensitometry of, S439
- exposures, intermittency effects, S528
- film for miniature copies of records, RP165
- film for permanent records, M144, M154, M158, M162
- filter factors, S409, S439
- lens, compensation of the aperture ratio markings for absorption, reflection, and vignetting losses, RP1803
- lens, effect of weak prism, RP1428
- lenses, aberrations, S311, S494
- lenses, charts for testing resolution, M166
- lenses, resolution test, C428
- method of detecting changes in group of objects, S392
- objective, testing, RP984
- paper, R98

(Continued on next page)

- paper sensitivity, RP20
 papers, dimensional changes, RP1051
 plate, action of charred paper, S454
 plates, color sensitive, S422
 plates, effect of development on resolving power and sensitivity, RP183
 radiometry, S319
 reversal by desensitizing dyes, RP541
 sensitivity, RP340, RP355, RP378
 sensitizing dyes, RP488
 tanks, resistance to hypo solution, RP864
 Photography, of interference phenomena, S441
 of projectiles in flight, S508, T255
 of stellar spectra, S318
 Photo-ionization of caesium, RP186, RP208, RP234
 of some alkali vapors, RP96
 Photometer, flicker and equality-of-brightness, S299
 for low luminances, RP1646
 Martens polarization, S367
 physical, S303, RP1415
 scale and recording device, S144
 Photometers, Matthews and Russell-Léonard, S12
 Photometric attachment for spectroscopes, S155
 comparison of glass screens and tungsten lamps, S277
 laboratory, use of white walls, S20
 standards, S50, S216, S222, RP325, RP699, C15
 units, S141, C459
 Photometry, barrier-layer photocells, RP1348
 carbon lamps, S115
 Fechner's law, S49
 flame standards, S222
 diffusing materials, RP704
 gas-filled lamps, S264
 heterochromatic, S238, S277, S299
 integrating sphere, S447
 reflected light, effect of cover glass, RP872
 Photomicrography of paper fibers, T217
 Photronic cell, in determination of lead, RP1165
 Phthalate, acid potassium, stability of aqueous solutions of, RP852
 Physical constants related to temperature scale, RP1189
 properties of dental materials, C433
 Physiological tests, mercury vapor exposure, RP1383
 Picnometer for determining density of molasses, (see also Pycnometer), T161
 Pickup, vacuum-tube acceleration, RP1754
 Piers, brick, compressive strength, T111
 Piezo-electric generator for audio-frequencies, RP40
 method for measuring high pressures, S445
 quartz disk as source of compressional waves in liquids, RP402
 stabilization, of audio frequency generator, S569
 Piezo oscillations of quartz cylinders, RP156
 oscillators, RP153, RP366, RP576, RP759, RP766
 oscillators, testing, RP135
 Pigments, effect on linseed oil, T71
 light fastness of ink, RP100
 tinting strength, RP7
 Pillowcases, bleached cotton, specification, C277
 rubber, specification, C224
 Pillows, rubber air, specification, C252
 Pima cotton for mail-bag duck, T277, T278
 Pinacyanol, mixtures, sensitization of emulsions, RP173
 Pine oil disinfectant, CS69
 Pintle bearings, accelerated service tests, RP854
 Pipe bends, pressure losses for liquid flow, RP965
 brass and copper; and tube, water, copper, R217
 cast-iron, French and American compared, T336
 cement-asbestos, in soils, RP1250
 clay, sewer, and fittings, R211
 coatings, RP359, RP982, RP1058, RP1171, RP1250
 conductor, R29
 eaves trough, R29
 fittings (gray cast iron, malleable, iron, and brass or bronze), R185
 lead, CS95
 nipples; brass, copper, steel, and wrought-iron, CS5
 nipples, wrought-iron, mechanical properties, RP124
 sewer and drain, bituminized-fiber, CS116
 stove, and accessories, R190
 threads, M42, M61, M141
 underground corrosion (see Soil corrosion)
 wrought-iron and wrought-steel; and fittings, R57
 Pipes, corrosion underground (see Corrosion and Soil-corrosion)
 ducts, and fittings, for warm-air heating and air conditioning, R207
 flow in bends, RP1110
 Pipettes, absorption, bubbler tips for, RP1214
 for gas analysis, RP266
 glass, testing, C9, C434
 testing, micrometer device, RP1019
 Piston gages, RP324
 Pitch, coal-tar, specifications, C155, C157
 Pitot tubes, C309
 Pitting, of steel, influence of cyclic stress, RP1307
 stress corrosion, aluminum bronze and monel metal, RP1366
 Planck's constant C_2 , S162, S287, S304
 equation, S204, S304
 equation, spectral distribution of energy tables and graphs, M56
 equation, tables (2,000° to 3,120° K), M86
 law, constants, RP1189
 law, new relation derived from, S259
 Planetary radiation, S460, S512, S553
 temperatures, RP1458
 Planoflex, for evaluating pliability of fabrics, RP1434
 Plant pigments, infrared absorption, RP617
 Plaster, C151
 adhesive, R85
 as fire protection for concrete columns, T272
 efflorescence on, RP1538
 base, suitability of fiber, insulating lath, BMS3
 board, gypsum, manufacture, C281
 board, gypsum, specification, C210
 colored, T181
 construction, durability, T70
 dental; investment, and artificial stone, pack aging of, R117
 gypsum, specification, C205
 surfaces, paint for priming, M137
 wood-fibered, specification, C205
 Plastering accessories, metal; and metal lath, R3
 Plasters, plasticity, T169
 Plastic calking materials, durability and performance, BMS33
 clay, flow-point pressure, RP1186
 flow laws, S278
 range values of Poisson's ratio, RP1742
 Plasticity of clay, S278, T46, T79, T234
 of enamel slips, T356
 of lime, RP1232
 of mortars and plasters, T169, T308
 Plastics, aircraft dopes, RP1098
 relaxation of stresses in, RP1637
 sources, properties, and uses, C411
 thermal-expansion stresses in, RP1745
 transparent, for aircraft, RP1031
 Plate, metal, thicknesses and weights, C391
 rectangular, stresses in, RP1450
 thickness, effect on stress distribution, RP277
 Plated coatings, measuring thickness, RP866
 metals, effect of polishing on protective value of coatings, RP1645
 metals, spotting, RP72
 Plates, bone, steel, CS37
 photographic, American, characteristics, S439
 photographic, color sensitive, S422
 photographic, stability, RP646
 steel, strain measurement, RP662
 Platforms, skid, R95
 Plating baths, measuring pH of alkaline cyanide, RP1291
 chromium, RP131, RP604
 nickel and chromium, on steel, exposure tests, RP712, RP724, RP1293
 nickel, on steel, RP1725
 solutions, "black nickel", T190
 solutions, zinc cyanide, T195
 steel, brass, and zinc; exposure tests, RP1293

- Platinum articles, marking, CS66
 black, electrolysis, S82
 black, reflecting power, S196
 emissivity, relation to resistivity, S243
 freezing point, S55, RP325, RP326
 metals, analytical separation, RP655
 metals, attack by acids, RP1614
 metals, determination of ruthenium, RP125
 metals, separation of ruthenium, RP654
 metals, spectra, S499
 point electrolytic detector, S36
 radiation, S24, S55, S105, S191
 resistance thermometers, intercomparison between —190° and 445° C, RP1454
 resistance thermometry, S124, S407
 separation of osmium, RP286
 spectrum, S499
 to platinum-rhodium thermocouples, reference tables, RP530
 volatilization, S280
 ware, quality, S254
- Platinum, rhodium alloys, physical properties, RP650
 -rhodium alloys, thermoelectric properties, RP537
- Pliability of fabrics, device for evaluating, RP1434
- Plow bolts, R23
- Plug and ring gage blanks, plain and thread, CS8
 gages, wear, RP276
- Plugs, fusible, boiler, reliability, RP129
- Plumbing fixtures, earthenware, CS111
 fixtures, hospital, R106
 porcelain (all clay), CS4
 prevention of backflow, BMS28
 specification, C310
 staple porcelain (all clay), CS4
 staple vitreous china, R52, CS20
 manual, BMS66
 recommended minimum requirements, BH2, BH13
 systems, back-siphonage, RP1086
 systems, methods of estimating loads, BMS65
- Plywood, Douglas-fir (domestic grades), CS45
 hardwood and eastern red cedar, CS35
 panels for walls, floors, and roofs, structural and heat-transfer properties, BMS99
 resin-bonded, effect of catalysts and pH on strength, RP1748
 structural properties of prefabricated, light-weight constructions for walls, partitions, floors, and roofs sponsored by the Douglas Fir Plywood Association, BMS104
 wall construction, structural properties, BMS-30
 Western hemlock, CS122
- Pneumatic tires, specification, C115
- Pocketknives, R99
- Poisson's ratio of some structural alloys for large strains, RP1742
 (steel), RP1473, RP1474, RP1501, RP1514, RP1527, RP1540
- Polarographic determination of cystine, RP1211
- Polarographic measurements, effect of reaction between mercury, water, oxygen, and metallic ions on wave height, RP1736
- Polarography, application of Iklovic equation, RP1631
- Polarimetric sensibility and accuracy, S35
- Polarimetry, C44, C440
 methods and equipment, C429
- Polariscope measurements, light sources, S34
 quartz compensating, S86, S98
- Polariscopic apparatus, testing, C12
- Polarization, measurement, S504, RP1336
- Polarized light, C429
- Poles, wood, for overhead electrical lines, H16
- Polishing materials, C383, C424
 metallographic, X-ray measurement of thickness of cold-worked surface layer resulting from, RP1494
 of metals for metallographic study, RP117
 of steel, effect on protective value of electroplated coatings, RP1645
- Politzer bags, rubber, specification, C222
- Polyhydroxy acids and lactones, RP1448, RP1497, RP1547, RP1576
- Polystyrene and styrene, heats of combustion and solution, RP1801
- Polymerization of olefins, RP740
- Polymers, elastic, permeability to hydrogen, RP-1327
- Pop safety valves, bronze, R204
 iron and steel, R201
- Porcelain bodies high in feldspar, T50
 constitution and microstructure, T80
 enamel, surface tension, RP1133
 -enameled iron, weather resistance, RP1476
 -enameled steel utensils, CS100
 -enameled tanks for domestic use, CS115
 glazes, T196
 insulators, one-piece, R73
 laboratory ware, tests, T105
 moisture expansion, RP288
 thermal expansion, S352
 viscosity, T30, T50
 ware, specifications, C310
- Porcelains of beryllia and other oxides, RP1703
- Pore system in bricks, RP1349
- Pores, determining size, RP1292
- Porous concrete of cement and uniform-sized gravel, properties, BMS96
- Porosity, changes in burning silica refractories, T116
 electroplated chromium coatings, RP368
- Portable wooden chairs, R80
- Portland cement (*see also* Cement)
 clinker, estimation of glass in, RP1805
 clinker, nature of prismatic dark interstitial material in, RP1536
 clinker pastes, composition and physical properties, RP1530, RP1533
 garnet and hydrogarnet series in relation to setting, RP1355
 phase equilibria, RP1421, RP1570
 phase equilibrium studies of potash compounds of, RP1512
 phase studies, RP1699
 spectrographic analysis, RP1786
 structure of tricalcium aluminate, RP1437
- Portland Cement Association's precast joist concrete floor construction, structural properties, BMS62
- Portland cements, relationship of the garnet-hydrogarnet series to sulfate resistance, RP1411
- Positions at National Bureau of Standards, M94, M152, M163
- Positive column, recombination radiation in the cesium, RP565
- Pot, clay, for manufacture of optical glass, C452
- Potash compounds of portland cement, phase equilibrium studies, RP1512
 -silica glasses, electrode function, RP1743
- Potassium chloride, effect of pH of mixtures of *o*-phthalic acid and potassium chloride: RP1673, RP1687
 dichromate, determination of water in, RP1600
 hydride, photoelectric properties, S319
 isotopes, concentration, RP1765, RP1766
 mannuronate, preparation and properties, RP1750
 permanganate solution, standardization by arsenious oxide, RP1057
 permanganate solution, standardization by sodium oxalate, S182
p-phenolsulfonate, assay, pH range, and ultraviolet absorption, RP1553
 photo-ionization of, RP96
 spectrum, S312
 sulfate in portland cement, RP1512
- Potato-starch size, RP623
- Potential measurements of electrodes, S364, S504, T146
- Potentials, critical of *cis*- and *trans*-2-butene, RP1775
 ionization and resonance, S317, S368, S400, S403, S505
 liquid-junction, RP1608
- Potentiometer circuit, reducing disturbances in galvanometer branch, RP1194, RP1195
 for comparing standard cells, RP586
 for measurement of 10 microvolts to an accuracy of 0.01 microvolt, RP1195
 multi-range, RP506
- Potentiometers, deflection, S33, S79, S172, S173
 testing, S223
- Potentiometric method for hydrogen-ion activity, RP1261
- Potsdam absolute determination of gravity, RP-1502
- Pottery materials, ball clays, T227

- Powder, diamond, grading of, CS123
metallurgy, patents, M184
smokeless, test of stability, S192
- Powders, scouring, for floors, specification, C370
- Power factor, dielectric constant, and conductivity of the system rubber-calcium carbonate, RP1457
factor of compounds of rubber and sulphur, RP585
factor of condensers, S18, S64, S166
factor of insulating materials, S471, T216, T284
factors of air capacitors, RP1212
factors of air capacitors, measurement, RP1138
factors of mica, RP1675
supply for amplifier, S450
- Poynting clamp for balance, S482
- Praseodymium, spectrophotometric determination, RP1395
- Precast-joint concrete floor construction, structural properties, BMS62
- "Precision-Built" constructions, structural properties, BMS48, BMS72, BMS89
- Preece test for zinc coatings, RP688
- "Pre-Fab", structural properties, BMS18
- Prefabricated homes, CS125
plywood, structural properties of, lightweight constructions for walls, partitions, floors and roofs sponsored by the Douglas Fir Plywood Association, BMS104
- Prefabricated wood-frame construction for walls, floors, and roofs, "PHC", BMS90
wall construction, "Precision Built, Jr." structural properties, BMS89
- Preservation, newspaper records, M145
records, M128, M140, M142, M144, M154, M158
records on photographic film, M162
- Pressboard, production from cornstalks, M123
- Press cloth, hair, test methods, T231
- Pressure calibrations of microphones, RP1341
gages (aircraft), T237
indicators, diaphragm type, RP1368
losses in curved pipes, RP965
losses in pipe bends, RP1110
regulation, for flow calorimeter, S503
measurements, RP324
measurements, sensitive aneroid diaphragm, RP1270
of wind on structures, S523, RP637
-volume relation for critical isotherm, RP1493
- Pressures of acids above 100° C., RP1622
of gases, relation to densities and temperatures, C279, M71
instantaneous measurement, S445
- Pretreatment processes for galvanized and plain steel surfaces, BMS44
- Priest-Lange reflectometer, RP847
- Primer, asphalt, specification, C162
- Priming coats on floor coverings, BMS59
plaster surfaces, paint for, M137
- Principal point, location, in airplane camera, RP1428
- Printing, offset, papers for, RP859
paper, expansivity, RP1054
papers, Braille, RP690
plates, rapid electrodeposition of iron, RP991
tests of book papers, RP1180
- Prism material, infra-red transmission and refraction, S401
material, transmission, S191
refractometry, RP575, RP776
refractometry, data computation, RP1572
- Prismatic dark interstitial material in portland cement clinker, nature, RP1536
- Prison bars, tool-resisting, magnetic testing, RP894
- Projectiles, photographing, in flight, S508, T255
- Projectors, motion-picture, acoustic performance, C439
motion picture, optical and mechanical characteristics, C437
- Promenade tile, specification, C158
- Propane, composition, manufacture, properties, and distribution, C420
heat of combustion, RP686
- Propeller, aircraft, vibration, RP556, RP764
aircraft, vibration indicator, RP678
fan characteristics, RP193, RP275
vibrations, effect of rotation, RP1148
- n*-Propylbenzene, heat of combustion, RP1629
- Propylene, heat of combustion, RP1024
vibrational frequencies, RP1768
- Protanopic vision, RP1618
- Protection against lightning, code for, H40
- Protective coatings, effect on absorption of moisture by gas-cell fabrics, RP818
preservation of records by, M168
rustproofing, C80
underground structures, C450
- Protein, combination with acid and base, RP1286
materials, spectral transmission, RP830
role of cystine in, RP1405
- Protein wool, affinity of anions of strong acids for, RP1452, RP1453
combination with acids, RP1510, RP1511, RP1523
structure, RP1500
- Proteins, combination of anions with, RP1377
estimation of amino nitrogen, RP1038
hydrolysis, catalyzed, RP1503
iodine number, RP689
- Proustite, spectrophotoelectrical sensitivity, S412
- Proving ring, RP147
- Proving rings, for calibrating testing machines C454
temperature coefficients, RP1726
- Pseudocumene, physical constants, RP614
- Psychrometric chart, M143, M146
- Public utility service standards, C68
- Publications of the Bureau of Standards, C24 and Supplements, C460
- Puddling of wrought iron, various processes, RP124
- Pulp, paper, from cornstalks, M147
paper, production from cereal straws, M124
sulphite, strength and stability of papers, RP574
- Pulps and papers, determination of cellulose, RP979
pentosans in, RP1199
volumetric determination of alpha-, beta-, and gamma-cellulose, RP1068
- Pulps, paper, T88
determination of resins, RP973
- Pulse amplifier, elimination of "noise", RP522
from Geiger-Müller counters, internal selector for studying, RP1509
- Pumps, liquid measuring, T81
- Puncture sealing compounds (tires), C320
- Purchase order forms, R37
- Purification and freezing points of 37 hydrocarbons, RP1734, RP1752
and properties of hydrocarbons, RP1695, RP1760
of gases by rectification, RP1372
- Purity, colorimetric, RP377
of hydrocarbons, RP1734, RP1752, RP1760
of hydrocarbons, determination by measurement of freezing points, RP1676
of 8 nonanes, 11 alkylcyclopentanes, 6 alkylcyclohexanes, and 4 butylbenzenes of American Petroleum Institute-Standard and American Petroleum Institute-National Bureau of Standards series, RP1760
- Putty, specification, C216
- Pycnometer for determining the volume change occurring at an electrode, RP428
- Pyranose-furanose interconversions, RP1104
- Pyranoses, configuration as related to properties, RP990
- Pyrrargyrite, photo-electric properties, S451
- Pyrex glass, expansivity, RP626
- Pyrheliometer, Marvin, S323
- Pyrite in clay, T370
- Pyrites, photoelectric properties, S322, S344
ultraviolet reflecting power, S493
- Pyrometer color screens, S260
testing, C7
tubes, T196
tubes, passage of gas through, RP354
- Pyrometers, radiation, S250
- Pyrometric filter for obtaining light at wave length 560 mμ, RP785
practice, T170
- Pyrometry, optical, S11, S121, RP65, RP258, RP326, RP568, RP676
- Pyroxylin coating, cotton cloth for, CS32
plastics as affected by heat, T98

Q

- Quantity, electric, absolute measurement, S139
 Quartz, absorption, reflection, and dispersion constants, S237
 crystal-units, electrical measurements, RP1774
 fibers, elastic properties, S7
 fused, optical heterogeneity, RP112
 fused, thermal expansion, S524
 glass, compressibility, RP1003
 glass, infrared spectral reflection, S168
 inversion, S557
 mercury vapor lamps, S330, S378
 plate mountings and temperature control for piezo oscillators, RP366
 plates, vibrations, RP356
 polarimetry constants, S34, S268, C44, C429
 reflection, S45, S237
 spectroradiometers, S401
 thermal expansion and transformation, RP-1668
 transmissive properties of fused and crystalline, T369
 -wedge saccharimeter, constants, S268
 Quebracho tanned leathers, hydrolysis by sulfuric acid, RP362
 Quenching cracks in tool steels, S513
 effect of mass and initial temperature, T295, T313
 media for steels, RP103, RP357
 rate of 24S aluminum alloy sheet, RP1378
 third principal series line of cesium, RP184
 Quicklime, causticizing, specification, C143
 cooking paper rags, specification, C96
 glass manufacture, specification, C118
 manufacture of calcium arsenate, specification C203
 manufacture of silica brick, specification, C153
 manufacture of sugar, specification, C207
 manufacture of sulphite pulp, specification, C144
 purification of water, specification, C231
 soap-making, specification, C372
 structural purposes, specification, C201
 Quinhydrone and hydrogen electrodes in solutions containing tannin, RP176
 Quinone phenolate, resonance theory, RP1424

R

- Race track, "camera finish", RP986
 Radiant energy, measured in absolute value, S261
 spectral distribution by Planck's equation, tables and graphs, M56
 visibility, S103, S154, S303, S305, S475, RP289
 Radiating disk, illumination from, S263
 surfaces, geometrical theory, S51
 Radiation constants, S204, S262, S284, S357, S406, RP1189
 constants, metals, S105
 equation, Planck's, S259, S304, S360
 from metals and oxides, S224, S242, S243, S249
 from metals bombarded by low-speed electrons, RP297, RP371, RP478, RP493
 from paints, T254
 luminous equivalent, S103, S154, S270, S303, S305, RP699, RP1189
 method for determining melting points, S62
 Nernst glower, S91
 penetrating, protection against, RP1735
 pyrometers, S11, S198, S250, T170, C7
 selective, S91, S97, S131, S156, S191
 selective, incandescent lamps, S40
 solar, effect upon balloons, T128
 standards, S227, RP578
 stellar and planetary, S244, S438, S460
 ultraviolet, meter, RP647
 ultraviolet solar, RP816, RP877, RP899, RP1469, RP1542
 ultraviolet solar and sky, RP1593
 ultraviolet solar, in stratosphere, RP1367
 ultraviolet, spectral erythemic reaction, RP631
 Wien's displacement law, S180
 Radiations injurious to eyes, protection from, T93, T369, H2, H24
 Radiators, aircraft engines, T211
 cast-iron, R174
 Radio, aircraft landing systems, RP238, RP602, RP1006
 antenna, underground, for airplane landing beam, RP1006
 antennas, capacity, S568
 beacon (*see also* Radio range)
 beacon, aircraft, unidirectional, RP35
 beacon, course and quadrant identification, RP593
 beacon, course-shift indicator, RP77
 beacon, directive, S480
 beacon system for airways, RP159
 beacon and receiving system for blind landing of aircraft, RP238
 compass, S428
 critical-frequency predictions, 1940, RP1279
 direction finder, aircraft, RP621
 direction finders, S428, S525, S536
 fadeouts, RP1016
 fading, S476, S561, RP70
 field-intensity measurements at broadcast frequencies, RP752, RP1156
 field-intensity recorder, RP597
 field-intensity records on broadcast antenna, RP874
 field-intensity variations, RP913
 frequencies, maximum usable, RP1096, RP-1100, RP1167, RP1363
 information, sources, C122
 installations, safety rules, H9, H35
 instruments and measurements, C74
 ionosphere measurements during solar eclipse, RP629, RP868
 ionosphere measurements, equipment (*see also* Ionosphere), RP608, RP1384
 ionosphere multifrequency records, RP769
 RP780, RP1001
 meteorograph, RP1082, RP1102, RP1169, RP1318, RP1329
 multifrequency recorder of ionosphere heights, RP608
 proximity fuze design, RP1723
 range and telephone for airways, RP341
 range-beacon, elimination of night effects, RP513
 range-beacons, phase synchronization in directive antenna arrays, RP581
 range, 12-course, for aircraft, RP154
 range, course indicators, RP28, RP160, RP336, RP338
 range on airways, RP148, RP155
 range reception, antennas, RP313
 Radio receivers, aircraft, RP19
 receivers, aircraft, volume control, RP330
 receiving set for ultra high frequencies, RP238
 receiving sets, methods of testing, T256
 receiving sets, simple, construction, C120, C121, C133, C137, C141
 reception in aircraft, ignition shielding, RP158
 recording of cosmic rays in the stratosphere, RP1254
 signals, spectroradiometric analysis, S477
 skip distance and ionosphere measurements, RP1013
 sonde, RP1082, RP1102, RP1169, RP1329
 standard-frequency transmitters, RP630
 subjects, classification, C138, C385
 telegraphy, high spark frequency, S96
 telegraphy, long-distance, S159, S226
 transmission and reception with antenna and coil aerials, S354
 transmission, correlation with ionosphere observations, RP632, RP1001, RP1013, RP1096, RP1100, RP1167, RP1363
 transmission, daylight effect, S159, S226
 transmission formula, S226
 transmission on Byrd Antarctic expedition RP412
 transmission, short wave (10 meters), S469
 transmitting sets, electron tube, S381
 waves, variation in direction, S353
 weather station for isolated locations, RP1318
 Radio-frequency ammeters, S206
 -amplification, S449, S450, RP856
 phase difference of insulating materials, T284
 resistance and inductance, T298, T330
 standardization by cathode-ray oscillograph, S489
 standards, RP759, RP766, RP925
 Radio-wave propagation, relation to terrestrial magnetism, RP76
 transmission, retardation in the ionosphere, RP1096, RP1100

Radioactive contamination detector, RP1223
luminous compound, brightness meter, RP702
luminous compounds, safe handling, H27

Radioactivity, measurement, RP641

Radiobalance, Callendar, S183

Radiometers, gold leaf, platinum, and selenium, S322
selective, S319

Radiometric investigation of spectra, S45
investigation of water of crystallization, S168
measurements of ultraviolet by filter method, RP318, RP370
measurements of ultraviolet solar radiation intensities in the stratosphere, RP1075
measurements, on stars and planets, S244, S438, S460, S512, S553
measurements on carbon arc, S539,

Radiometry, instruments and methods, S85, S188, S229, S319
photoelectric, applications of tungsten-in-quartz lamp in, RP1543

Radiomicrometer, S85, S156
vacuum, S46, S188

Radiotelegraphic antennas, S257, S269, S326, C74
transmission, S96, S159, S226, S354

Radiotelephone sets, use of modulator tube, S423

Radium B + C, RP339
beryllium neutron sources, internal absorption of gamma rays, RP1257
content, determination, RP1792
counting method for determination of small amounts, RP1557
detector, RP663, RP1154
exposure meter, RP1246
measurement of gamma radiation, RP1283
protection, C374, H18, H23
protection during air raids, H38
protection for amounts up to 300 milligrams, H18

Radon, counting method for determination of small amounts, RP1557
(radium emanation), RP339

Raffinose, preparation, S432

Rag felt, asphalt saturated, specification, C161
coal tar saturated, specification, C156

Rags, white cotton, specification, C264
wiping, colored cotton, specification, C261

Raies ultimes of Zr I, RP296

Rail joints and bonds in electric railways, T62
steel, tensile properties, at elevated temperatures, RP164
steel, titanium and silicon deoxidation, T241
steels, endurance and other properties, T363, RP92, RP182
steels, secondary brittleness, RP408, RP409

Railroad signal colors and glasses, specification, RP1688
signal glasses, standardization and specification, RP1209
signal light colors, RP1565
track scales, specifications, C83, C333

Rails, steel, finishing temperatures and properties, T38
steel, from sink-head and ordinary ingots, T178
steel, service tests, RP1042

Railway materials, foreign specifications, T61
track scales for light industrial service, C386

Railways, electric, construction and maintenance, T62
electric, current leakage, T63, T75, T127

Ramie microscopic structure, RP1482

Range boilers, R8
boilers, nonferrous, R181
distance of broadcasting stations, T297

Rare earth elements, preparation, S421
oxide glasses, infrared absorption, RP1761

Rare earths, spectrophotometric determination, RP1395, RP1456

Rasps, R6

Rate-of-climb indicators, aircraft, T237

Rayleigh current balance, attraction between coils RP615

Rayon blankets, properties, RP1589
determination, RP821
effect of 1-percent NaOH, RP1146
papermaking material, RP143
ultraviolet transmission, RP6
yarns, relation between twist and certain properties, RP361

Rayon and cotton velour, CS103

Rayons, wet, method of measuring stress-strain relations, RP122

Rays, cathode, photographic registration, RP400

Razor blades, packaging, R69

Reactors, air-core and iron-core, design, RP342

Reclaimed rubber, comparison with new rubber, T294

Reclaiming porous castings, RP1740

Recoil of α particles, RP166

Recombination into the cesium 1^2S level, RP274
of electrons in the ionosphere, RP1342
spectra of caesium and helium, RP46

Recorder, automatic, for ionosphere heights, RP-373, RP608
field intensity of radio waves, RP597

Recording apparatus, radio method for synchronizing, RP269
device for precision photometers, S144
instrument inks, RP935
instruments, aircraft, T237

Records, miniature copies, photographic film for, R165
motion-picture film for, M158
newspaper, preservation, M145
preservation, M128, M140, M142, M144, M154, M168, RP779
preservation of film, RP942, RP950, M162

Recrystallization, bronze as affected by cold work, T60
continuous, apparatus, RP1351

Rectifier, electrical (*see* Detector)

Rectifiers, contact, S94
electric, theory and performance, T265
X-ray, RP527

Rectifying column, chain-packed, RP579
columns of glass, RP379
columns of high efficiency, RP1724
columns, reflux regulator and head, RP1249
effects in conducting gases, S6

Red brass, physical properties, RP1553
cedar closet lining, aromatic, CS26
cedar shingles, CS31
enamel, hardness, high-speed steel, S395
enamel, water resisting, specification, C146
lead, shortness of iron, T261
lead, specification, C90

Reducing powers of various sugars, RP1282
sugar, analysis, RP1757
sugar determination, RP1638
sugar, determination by Munson and Walker method, RP1417
sugar, method of formation, RP1301

Reductinic acid, mechanism of formation from pentoses and galacturonic acid, RP1594

Redwood viscometer, T210

Reed indicators, theory of design and calibration, RP338
tuned, for visual reception of aircraft radio-beacon signals, RP28, RP238, RP336

Refining of sugar, use of chlorites, RP1436

Reflectance measurements, effect of a cover glass, RP872
methods of determining gloss, RP958
paper, paint, vitreous enamel, and dental silicate cement, RP1026
spectral, of abaca fiber, RP628

Reflecting power, aluminum, duralumin, rhodium, tin, RP141
beryllium, chromium, and other metals, RP39
metals, S152
rhodium, RP1168
variations with angle of incidence, S196
various substances, S196

Reflecting surfaces produced by the deposition of metals on glass, C389

Reflection coefficient of electrical waves, S114
diffusely incident light, RP1504
factors, measured by Ulbricht sphere, S415
losses of a photographic lens, compensation by aperture ratio marking, RP1803
measurements, spectral, RP30
spectra, infrared, S45

Reflection-transmission relationships in sheet materials, RP1430

Reflectometer, absolute, S391, S405
photo-electric, RP1345
porcelain enamels, RP847

Reflectometry of diffusing materials, RP3, RP704

Reflector, glass disk for 70-inch telescope, RP97

- Reflux control for electromigration cells, RP1765
regulator for laboratory distilling columns, RP1615
- Refraction data on standard optical materials, S401
specific, of glasses, RP1352
- Refractive index, air, S327, RP695
amyl alcohols, RP1551
crystals, RP829
determination by immersion, RP814
determination by spectrometer, RP64, RP262, RP575
distilled water, RP934, RP1085
distilled water as function of temperature, RP971
fluorocrown glasses, RP1659
fused quartz, RP112
glass, at high temperatures, S521
heavy water, RP703
lead oxide-alumina-silica glasses, RP1564
measurement, RP1535, RP1572, RP1575
rubber, RP786
soda-aluminum-silica glasses, RP762
soda-lime-silica glasses, RP316
- Refractive indices, rock salt, S418
hydrocarbons, method for calculating, RP1651
- Refractivity, glass, changes caused by annealing, RP1793
optical glass, effect of heat treatment, S572
- Refractometer, gas, S316
- Refractometry, immersion, RP1575
minimum-deviation prism, RP262, RP776, RP1572
sources of error in, RP1535, RP1575
temperature control, RP919
- Refractories, analysis, RP180
clay, testing, T7
cupola, R154
elasticity at different temperatures, RP747
expansion to 1,800° C, RP562
high alumina content, RP5
malleable foundry, R79
plastic fire-clay, specification, C297
silica, manufacture and properties, T116
special, for use at high temperature, RP327
special, slip-casting of crucibles from, RP1236
tensile properties, RP923
thermal expansion, RP114, RP562, RP747
- Refractory bodies, strength, T104
bricks, creep and elastic behavior, RP1770
clay pots, attack on by optical glasses, RP1689
clays, T79
elements, melting points, S205
materials, preparing for analysis, RP1614, RP1621
metals and alloys, analysis, RP1621
mortar, air-setting, dry type, RP1461
oxides, melting points, S212
- Refractory-bonding mortars of the wet-type, air-setting, RP1219
- Refrigeration, condensing units, electric, CS(E)107
machines, ammonia absorption, T180
- Refrigerator ice compartments, R109
- Regain of mercerized cotton yarns, CS11
- Regeneration in amplifiers, S487
- Register of offset prints, RP859
- Regulations, specifications, and tolerances for commercial weighing and measuring devices, H29
- Reheat factor in steam turbines, S167
- Reinforced brick walls, structural properties, BMS24
concrete beams, effect of stress reversals, T182
concrete beams, strength, T2
concrete columns, fire resistance, T272
concrete columns, tests, T122
concrete frames, effect of brackets, RP9
- Reinforced-concrete foundation walls, structural properties, BMS26
- Reinforcement bars, areas and tensile properties, RP486
concrete, influence on cracking, RP1545
- Reinforcing bars, splices, RP1669
bars, steel, R26
spirals, steel, R53
- Reinforcing-bars, concrete, comparative bond efficiency, RP1755
- Relative humidity cabinet, constant, C453
determination (charts), M143, M146
- Relief valves, iron, steel, and bronze, R204
iron and steel; for petroleum, chemical, and general industrial services, R205
- Reluctivity relationship, magnetic, S404, S546
- Remote control system for electric testing laboratory, S291
- Repairing porous castings, RP1740
- Replica method for evaluating finish, RP1625
- Reports, annual, of the Director of the National Bureau of Standards for fiscal years ending June 30:
1902, M22
1903, M23
1904, M24
1905, M25
1906, M26
1907, M27
1908, M28
1909, M29
1910, M30
1911, M31
1912, M32
1913, M33
1914, M34
1915, M35
1916, M36
1917, M37
1918, M38
1919, M40
1920, M44
1921, M47
1922, M50
1923, M53
1924, M60
1925, M69
1926, M75
1927, M81
1928, M88
1929, M102
1930, M115
1931, M131
1932, M138
(Later reports included in Annual Reports of the Secretary of Commerce).
- Research associates at the Bureau of Standards, C296
laboratories, college, directory, M125, M171, M187
- Resin compounds, thermal-expansion stresses in, RP1745
- Resin finishes for aircraft, permeability to moisture, RP974
in drier, T66
in paper, RP973
in varnish, T65
melamine, in currency papers, RP1701
vinyl, durability of films, RP146
- Resin-bonded plywood, effect of catalysts and pH on strength, RP1748
- Resins, ring and ball test for softening point, RP142
permeability of organic polysulfide, RP1020
sealing castings, RP1740
- Resistance, absolute measurement, S111, RP857, RP1137
airplane antenna, S341
alloys, copper, manganese and aluminum, RP863
alloys, gold-chromium, RP737, RP1206
alloys, gold-cobalt, RP789
alternating-current, of conductors, S374
alternating-current, of solenoids, S76, S472
batteries, S504
coils for alternating currents, S177
coils, inductance, S175
coils, noninductive, S177, S246, S281
copper, temperature coefficient, S147
coupling of amplifiers, S449, C74
earth, related to electrolysis of underground structures, T26
effective, iron wires, S236, S252
effective, skin effect, S169, S252, S374, S430, C74
electrical insulating materials, radio-frequency, measurement, S471
high-frequency, inductance coils, S430
iron and bimetallic wires, S252
leakage, of street-railway roadbeds, T127
low, measurement, S225, S481
oil to emulsification, T86
precise comparisons, C21, RP1323
radio-frequency, T298, T330
radiotelegraphic antennas, S189, S257, S269, C74

(Continued on next page)

- standards, S107, RP201, RP639, RP657
standards, four terminal, for alternating current, S281, RP133
standards, low-valued, adjustment of temperature coefficient and resistance, RP639
standards, mercurial, S102, S256, M16
standards, methods of comparison, RP1323
standards, pure-metal, RP657
thermometers, S68, S200, S294, S407
thermometers, calibration between 14° and 83° K, RP1188
thermometers, coiled-filament, RP508
thermometers, electrical conduction in glass insulation, RP1466
thermometry, S124, S241, S288
variation with humidity, S73
windage, of steam-turbine wheels, S208
- Resistivity, chromic acid, RP198
earth, measurements, S258
electrical insulating materials, S234, S471, T216
platinum, relation to total emissivity, S243
rubber and gutta-percha, T299
rubber-sulfur compounds, S560, RP585
soils, T351, RP298
sulfuric acid, RP738
- Resistor furnace, using special oxide resistors, RP1443
Resistors, adjustable, RP842
electrolytic, for temperature measurement, RP1126
manganin, stability, RP1692
shielded, S516
- Resolving power and depth of focus in airplane camera lenses, RP1636
and distortion of airplane-camera lenses, RP1216
of objectives, S122
- Resonance, benzoin indicators, RP1791
indicator, improved type, for wave meter, S502
potentials, metals of second group, S403
radio circuits, S158, S235, C74
- Resonance and quenching of the third principal series of cesium, RP184
- Respiratory organs, safety code, H24
- Restaurant, cafeteria chinaware, R33, C202
guest checks, R113
- Restitution of a ball, coefficient, RP1624
- Resuscitation, C397
- Retina, blue arcs, RP43
- Reverberation meter, automatic, for measurement of sound absorption, RP457
time, measurement, RP465
- Reversal-temperature measurements of cesium discharge, RP869
- Revolver, gas leakage, S508
- Rhenium, colorimetric determination, separation from molybdenum, RP1248
properties, RP999
spectrum, RP322, RP564
- Rhodium, analytical separation, RP655
determination, RP489
effect on determination of iridium, S483
freezing point, RP676
physical properties, RP127
purification, RP676
separation of osmium from, RP286
spectral reflectivity, RP1168
spectrum, S499
ultraviolet reflection, RP141
- Rhodium-plating alloys, RP650
- Ribbons, computing and recording machine, specification, C188
hctograph, specification, C187
typewriter, C431
typewriter, specification, C186
- Ridge rolls, eaves trough, conductor pipe, and fittings, R29
- Rifle-barrel steel, flaws, S343
- Rigid frame, stress analysis, RP1431
- Rigidity axial, perforated tension members, RP1568
structural members, RP1737
- Rigidity modulus, temperature coefficient, RP531
- Ring, proving, RP147
specimens for magnetic tests, S108
test of cast-iron pipe, T336
- Ring and ball test, RP142
- Rings, proving, calibrating testing machines, C454
proving, temperature coefficients, RP1726
veritas firing, T40
- Ripening, photographic, RP340
- River beds, scour, RP907
- Rivet steels, air-hardening, T358
- Rivets, steel, R221
- Robertson Company's "Keystone Beam Steel Floor" constructions, structural properties, BMS10
- Rock salt, refractive indices, S418
spectroradiometers, S401
- Rockwell and Brinell numbers, correlation, RP185, T334
- Rods, steel spiral, R53
- Rolled-gold-plate articles, marking, CS47
- Roller bearings, friction and carrying capacity, T201
taper, R67
- Rolls, corrugated-board, single faced, (for department and specialty store use), R177
drying, temperature, RP231
- Roof gutters, flow in, RP644
lights, R49
- Roofing, asphalt, accelerated weathering test, RP886, RP1002
built-up, specifications for materials, C156, C157, C158, C159, C160, C161, C162, C168, C180, C181, (See references to specific materials)
- Roofing, built-up, specifications for various types, C170, C171, C172, C173, C174, C175, C176, C177, C178, C179
copper, seams, RP216
copper-valley flashings, corrosion, RP123
felts, experimental production, RP67
felts, weathering, RP888
in the United States, results of questionnaire, BMS57
iron and steel, R78
materials, survey in North Central States, BMS75
materials survey in Northeastern States, BMS29
materials, survey in South Central States, BMS84
materials survey in Southeastern States, BMS6
metallic, for low-cost housing, BMS49
roll, asphalt; and asphalt- and tar-saturated-felt products, E213
slate, R14
slate, properties and weathering, RP477
slate-surfaced asphalt, specification, C285
ternes, R30
- Roofs, structural and heat-transfer properties of "Multiple Box-Girder Plywood Panels" for, BMS99
structural properties, BMS9, BMS12, BMS46
structural properties of "PHC" prefabricated wood-frame construction for, BMS90
wood-frame, structural properties, BMS25, BMS36
- Roots of equations, method of finding, RP790
- Rope, cotton, specification, C326
elevator, maintenance, C441
manila, color of fiber, RP627
manila, specification, C324
manila, tests, T198
sisal and nylon, impact strength, RP1679
tests of fibers for, RP1611
wire hoisting, testing by magnetic analysis, T315
wire, sizes, R198
wire, specification, C208
wire, strength and other properties, T121
worn wire, strength and inspection, RP920
yarns, standard bending test, T300
- Rosenhain furnace, modified, S348
- Rosin paper-sizing materials, light sensitivity, RP307
- Rotary dispersion method for measurement of color temperature, S443
distillation column, efficiency, RP1201
gas meters, testing, RP1741
- Rotary-cut lumber stock for wire-bound boxes, R59
- Rotation, optical (see Optical rotation)
- Rotatory dispersion for glucosides, RP1601

Rubber, adiabatic tensile properties, RP1256
 air pillows, specification, C252
 analysis, T35, T45, T136, T145, T154, T162, C38, C232
 aprons, surgeons', specification, C247
 bandages, specification, C219
 bands, specification, C284
 behavior in molecular still, RP1202
 boots, specification, C348, C349, C350
 catheters, specification, C225
 change of electrical properties during storage under water, RP213
 change of volume on stretching, RP936
 coating, cotton cloth for, CS32
 colon tubes, specification, C221
 compounds, wear tests, T294
 crystalline, density, RP1416
 crystalline, effect of pressure on melting, RP1677
 crystalline sol, X-ray diffraction patterns, RP1170
 crystallization at different temperatures, RP1718
 crystallized from solution, X-ray patterns, RP1039
 cutting and shear tests, RP674
 cylinder, torsion of, RP1802
 dam, specification, C218
 dental (base and veneering), R188
 determination by combustion method, T35
 determination by nitrosite method, T145
 determination of sulfur in, S174, T45
 diaphragm packing, specification, C240
 dielectric constant, power factor and resistivity, T299
 effect of antioxidants, RP795
 effect of temperature, T364
 finger cots, specification, C226
 forms, RP717
 fountain syringe, specification, C251
 friction tape, specification, C229
 frictional properties, dielectric constant, power factor, and conductivity, RP1457, RP1463
 gas tubing, tests, T133
 gloves, specification, C271
 gloves, surgeons', CS40
 gloves, surgeons', specification, C217
 goods, barium carbonate and barium sulfate, in, T64
 goods, cellulose in, T154
 goods, extraction, T162
 goods, free carbon in, T136
 goods, general specification, C232
 goods, soft, aging, T342
 goods, testing, C38, C232
 guayule, T353
 heat capacity, entropy, and free energy, RP844
 heat of combustion, RP713
 hose, (*see* Hose)
 hot water bottles, specification, C248
 hydrocarbon, melting, purification, crystallization, composition, and properties of ether-soluble, RP544
 hydrocarbon, properties, RP719, RP720
 hydrogen sulfide from vulcanized, RP464
 ice bags, specifications, C227, C228
 insulating tape, specification, C230
 interferometric measurement of dimensional changes, RP1253
 Mangabeira, RP1785
 matting, specification, C306, C312
 natural and synthetic, M185
 optical and dimensional changes during freezing and melting, RP1129
 packing, (*see* Packing)
 permeability to gases, T113, S387, RP1166
 photoelastic determination of stresses around a circular inclusion, RP1083
 photoelastic properties, RP751
 pillowcases, specification, C224
 politzer bags, specification, C222
 purification and properties, RP449
 reclaimed, C393, T294
 ring cushions, specification, C246
 sheeting, hospital, CS88
 sheeting, specification, C253
 solubility of gases in, RP661
 sponge, properties, C377
 stoppers, specification, C308
 surgical operating pads, specification, C245

synthetic, GR-S, specific heat and increases of entropy and enthalpy, RP1595
 synthetic, measurement of densities, RP1507
 synthetic, properties, RP1487, RP1554, RP-1507
 tensile properties, T364
 tips for crutches, specification, C223
 tires, use and care, C341
 toggle clamp for tensile testing of, RP1204
 tubing, specification, C305
 valves, specification, C244
 X-ray diffraction patterns, RP1218
 Rubber and associated substances, spectral transmission, RP830
 Rubber-sulfur compounds, density and electrical properties, S560
 effect of pressure on electrical properties, RP806
 effect of temperature and frequency on electrical properties, RP585
 heats of combustion, RP713
 refractive index, RP786
 specific volume, compressibility and volume thermal expansivity, RP760
 Rubber-sulfur system, heats of reaction, RP791
 Rubbers, synthetic, composition, properties, and uses, C427
 permeability to hydrogen, RP1327
 Rubidium, spectrum, S312
 Ruby mica, color standard, RP1671
 Rugs, testing, RP1505
 Rugs and carpets, Axminster, specification, C353
 Wilton, specification, C356
 Rust-preventive compounds, specifications, C200, C214
 Rustproofing iron and steel, C80
 Ruthenium, determination, RP125
 effect on determination of iridium, S483
 separation from Ir, Pd, Pt, and Rh, RP654
 separation of osmium from, RP286
 spectrum, S499

S

Saccharimeter, quartz-wedge, constants, S268
 scale, French, RP916
 Saccharimetric normal weight, S268, S293
 Saccharimetry, methods and equipment, C429
 Saccharinic acids, mechanism for the formation, RP1573
 Sacks, cement, cotton and jute, T292
 Safety code, brakes and brake testing, M107
 elevators, C441, C442, C443, C444
 logging and sawmills, H5
 National Electrical, C54, C72, H3, H4, H6, H7, H8, H9, H10, H31, H32, H33, H34, H35, H36
 National Electric, discussion, grounding rules, H39
 protection against lightning, M92, H17, H21, H40
 protection against radium, C374, H23
 protection against radium up to 300 milligrams, H18
 protection of heads and eyes, H2
 for protection of heads, eyes, and respiratory organs, H24
 Safety for the household, C75, C397, C463
 Safety rules, electric fences, H36
 electric utilization equipment, H7, H33
 electrical supply and communication lines, H10, H32
 electrical supply stations, H6, H31
 handling of radioactive luminous compound, H27
 operation of electrical equipment and lines, H8, H34
 radio installations, H9, H35
 X-ray protection, C374, H15, H20
 Safety valves, pop, bronze, R204
 iron and steel, R201
 Safety wearing apparel; materials for, CS129
 Sagger bodies, effect of size of grog, T104
 bodies, preparation of experimental, RP104
 clays, properties, RP387, RP827
 Salad oil, shortening, and cooking oil, packaging, R193
 Salicin and halogenosalicins, hydrolysis, RP1398
 Salinity of sea water, by electrical conductivity method, RP223

- Salt, change in transference number, RP314
effects on activity coefficients, RP1746
effects, metacresolsulfonphthalein, RP1569
packages, R70
spray test of electroplated coating, RP1645
- Salts in lime and cement producing efflorescence, T370
- Salvaging porous castings, RP1740
- Samarium, spectrophotometric determination, RP-1395
spectrum, S442
- Samples, standard, for thermometric fixed points, C66, C398
standard, general information, C25, C398
standard hydrocarbons, RP1744
standard, list of, C398 supplement
- Sampling and inspection, BMS105
of metallurgical materials, RP237
- Sand, molding, fineness test, RP757, RP1720
- Sand-lime brick, R38
description and specification, C109, C347
manufacture and properties, T85
walls, compressive strength, T276
- Sandstone, permeability, T305
- Sanitary ware, colors, CS30
cast-iron enameled, CS77
- Sapphire, heat capacity, RP1797
- Saturated vapors, formula for density, RP616
- Saturation, magnetic, of iron, RP1354
pressure of water, RP523
purity, colorimetric, RP377
relations in sugar mixtures, T259
tints of yellow, T92
- Sawmill Safety Code, H5
- Saws, band, metal cutting; hard edge, flexible back, R214
- Saybolt universal viscosimeter, T100, T112
viscosity of blends, T164
- Scale, divided, calibration, C329
weighing, with stabilized platform, T106
- Scales, commercial, specifications and tolerances, M85, H22, H29
investigation and testing, H11, H26
large-capacity, tests, T199, M104
railroad track, specifications, C83, C333
railway track, light industrial service, C386
specifications for hand-operated grain hopper scales, C199
weighing, testing of, H37
- Scandium monoxide, band spectrum, RP273
spectra of, S549, S558
- Scattering of light in liquids, RP175
- School furniture, color, R111
tables, R91
- Schopper folding tester, calibration and adjustment T357, C379
- Scleroscope hardness, T11
- Scoops, R48
- "Scot-Bilt" sheet-steel constructions for walls, floors, and roofs, structural properties, BMS46
- Scour of river beds, RP907
- Scouring powders for floors, specification, C370
- Scrap, iron and steel; classification, R58
- Screen wire cloth, exposure tests, RP803
wire cloth, insect, R122
- Screening, insect wire, CS138
- Screens (*See* Sieves)
mineral aggregate production, wire diameters for, R147
production, for mineral aggregates; wire diameters, R147
- Screw jacks, bell-bottom, R97
- Thread Commission, National, reports, M42, M61, M89, M141
gages, M42, M61
gages, standard designs, M100
locks, RP386
pitches, comparison, M49
pitches, graphic comparison chart, M121
standards for Federal Services, H25, H28
tables for shop use, I. Standard threads, M98
II. Special threads, M99
- Screw threads, special, CS25
standard, CS24
standard, for Federal Services, H28 (1944)
for oil well equipment, M89
helix angle chart, M109
- Screws, bone, steel, CS37
machine and cap, standard proportions, H28 (1944)
wood, holding power, T319
wood, specification, C140
- Sea water, effect upon cements, T12
- Sealants for porous castings, RP1740
- Sealed tubes for preparation of solutions, RP1614, RP1621, RP1622
- Sealing leaky castings, RP1740
tape, No. 1 kraft paper, R114
- Seams, copper roofing, RP216
sewing-machine, tests, T96
stitched, specification, C283
- Searchlight arcs, high-intensity, T168
"Season cracking" of brass, T82
- Seats for water-closet bowls, CS29
- Sector wheel, photographic, intermittency effects, S528
photographic sensitometer, S511
- Sectored disk, S26, S156, S319
- Sediment, movement in rivers, RP907
- Sedimentation method for particle size determinations, RP642
- Seismometer, RP66
- Selectivity, radio receiving sets, T256
- Selenium, photo-electrical properties, S319, S322, S338, S398
- Selenium radiometers, S322
- Selenite, infrared spectral transmission, S418
- Self inductance, (*see* Inductance)
- Self-contained mechanically refrigerated drinking water coolers, CS127
- Sensation curves for color, RP163
- Sensibility to chromatocity differences, RP1099
- Sensitivity and accuracy of measuring instruments, S328
indices, photographic, RP354
of a galvanometer as a function of its resistance, RP150
of photographic materials to charred paper emanations, S454
of photographic plates, comparison with resolving power, RP183
of radio receiving sets, T256
- Sensitization, photographic, RP622, RP659
- Sensitizing photographic plates by bathing, S422
- Sensitometer, nonintermittent, S511
- Sensitometry of photographic emulsions, S439, RP598
- Separators, storage battery, T271
- Sera, determination of potency, RP263
- Sericin in raw silk, RP1290
- Service standards, electric, C56
gas, C32, C405
- Sewage loads in plumbing systems, estimating, BMS65
- Sewer pipe, bituminized-fiber, drain and, CS116
- Sewing, specifications, C283
- Sextants, marine, specifications, C110
- Shade cloth, specification, C364
- Shades, window, cloth, R199
window, specification, C368
- Shafting, tubular, tests, RP161
- Shatter cracks, RP92, RP164
- Sheathing boards, fiber, BMS13
papers, RP85
papers, stability, BMS35
- Sheaves, effect on wire rope, T229
- Sheet materials, apparatus for photochemical study, RP1300
materials, reflection-transmission relationships, RP1430
metal, thicknesses and weights, C391
steel, R28
- Sheet-blanket combination for outdoor use, RP1529
- Sheeting for mattress protection, CS114
specifications, C272, C273, C278
rubber, specification, C253
rubber, hospital, CS38
- Sheets, bleached, specification, C274
- Shelf-angle connections, strength of welded, RP230
- Shellac, T232
determination of insoluble matter, RP391
orange, specification, C302
varnish, determination of nonvolatile matter, RP1333
varnish, specification, C303
- Shells, loaded, paper shot, R31

Shingles, asphalt, accelerated weathering, RP1002
 asphalt-prepared, BMS70
 slate-surfaced asphalt, specification, C285
 wood, CS31

Ship plate, corrosion, RP42

Shipping cases, hosiery, C169
 tags, paper, R93

Shirts, boys, CS14
 sizes, men's (exclusive of work shirts), CS135
 sizes, men's sport — woven fabrics, (other than those marked with regular neckband sizes), CS128

Shoe going, elastic, R112
 laces, braided, R168

Shoes, construction, C419

Shortening, salad oil, and cooking oil, packaging, R193

Shorts, woven fabrics, men's and boys', size measurements for, CS137

Shot shells, loaded paper, R31

Shovels, crawler mounted, revolving power, (export classifications), CS90E
 spades, and scoops, R48

Showers, metal partitions for, R101

Shrinkage by laundering, T273
 fire clays, T79, T144
 iron in casting, RP440
 metals in casting, RP399
 photographic film and paper, RP1051
 refractory bodies, T104

Shunts, alternating currents, RP133
 brush, R56

Sidewalk lights, R49

Sieve, specifications, T321
 cement, standard, T29, T42, C39

Signal colors and glasses for railroads, specification, RP1688
 glasses, railroad, standardization and specification, RP1209
 light colors, designation, RP1565
 lights, selection of colors, RP956
 systems, direction, electric, for vehicles, CS80

Silica brick, constitution and microstructure, T124
 content in cement, rapid method for determination, RP891
 crystals in devitrified glass, RP1152, RP1153
 determination, RP1331
 determination in presence of fluorine, RP110
 determination in steel, RP496
 fused, thermal expansion, S524
 gel, adsorption and desorption of nitrogen by, RP1674
 gel, purification of hydrocarbons by adsorption, RP1643
 gel, separation of hydrocarbons by adsorption, RP809, RP1185
 glass, compressibility, RP1003
 inversion effects in white-ware bodies, T310
 phase studies with relation to portland cement, RP1699
 refractories, T116
 systems, (See Phase Equilibria)

Silica-alumina-lead oxide system, RP1564

Silicate, calcium, hydrated, X-ray patterns, RP1560

Silicates, decomposition for analysis, RP180, RP-1331
 of low thermal expansion, RP456

Silicon, deoxidizer of rail steel, T241
 detector of electric currents, S94, C74
 reflecting power, S152
 spectrum, RP624, RP1124
 structural steel, T331

Silicon and its alloys, C346

Silk, aging test, RP855
 combination with positive and negative ions, RP543
 degumming, electrophoresis and isoelectric point, RP1234
 determination, RP821
 effect of dry cleaning, T322
 effect of service conditions, T322
 effect of pH on photochemical decomposition, RP395
 fibroin, combination with acid and with base, RP1360
 hosiery, performance specification, M149
 isoelectric point, RP490
 methylation with diazomethane, RP1338
 photochemical decomposition, RP395, RP697, RP1404
 raw, fractions of sericin in, RP1290

waste for cartridge bag cloth, T268
 weighted, analysis, RP498
 yarns, effect of humidity on strength and elongation, RP1353

Silver chloride in chemical analysis, effect of light, RP134
 combination with gold, marking of articles, CS51
 coulometer, S16 (See also Voltameter)
 determination and adsorption, RP836
 emission and absorption of radiation, RP421
 film on glass, method for measuring thickness, C389
 freezing temperature, RP557
 ion concentrations in photographic emulsions, RP376
 lacquered, reflecting power, S342
 nitrate, photoelectric properties, S462
 nitrate, preparation and testing, S201
 nonhalide, determination in photographic emulsions, RP447
 novelties of, marking, CS118
 photo-electrical properties of halide salts, S456
 properties and uses, C412
 reflecting power, S196
 spectrographic determination in tin, RP1451
 spectrum, S411
 sterling, flatware, R54
 sulfide, electrical properties, S310
 sulfide, spectral photo-electric sensitivity, S344, S398, S446
 tarnish resistance of alloys, T348
 titration with thiocyanate in the presence of mercury, RP1391
 voltameter, S2, S27, S102, S171, S194, S195, S201, S218, S220, S240, S271, S283, S285, M16
 voltameter, proposed specifications, S285

Silver-chloride electrodes, use, RP1495, RP1524, RP1537, RP1559, RP1567, RP1580, RP1586

Silvering and evacuating Pyrex Dewar flasks, RP385

Silver-plating solutions, analysis, RP384
 bromide electrode, RP376
 chloride electrode, effect of certain ions on, RP1739
 chloride electrode, reproducibility, RP1108, RP1183
 halide electrodes, reproducibility, RP1183

Similarity, dynamical, aerodynamics, S394

Simplified Practice, primer, R XIII

Simplified Practice Recommendations (see list, p. 193. Indexed also under specific subjects.)
 what it is and what it offers, RXI

Sine bars, blocks, plates, and fixtures, CS141

Single crystals of copper, RP1385

Singletrees, doubletrees, and neckyokes, R134

Sink and lavatory traps, R21

Sisal and nylon rope, impact strength, RP1679

Size grading of diamond powder, RP1716
 measurements for men's and boys' shorts; woven fabrics, CS187

Sizes of manufactured articles (See list of Simplified Practice Recommendations, page 193)
 boys' pajama (woven fabrics), CS106
 men's pajama — woven fabrics, CS15
 men's shirt (exclusive of work shirts), CS135
 men's sport shirt — woven fabrics (other than those marked with regular neckband sizes), CS128
 women's slip (woven fabrics), CS121

Sizing materials, effect on stability of book papers, RP1149
 measurement of paper, T326
 paper, suitability of sweetpotato starch, M150
 sweetpotato starch, consistency, RP623
 yarns, effect on properties, RP993

Skid platforms, R95

Skin effect, S76, S169, S252, S374, S430, S509, C74, RP113

Skip distance of radio waves, RP1096, RP1100

Sky radiation, ultraviolet, RP1593

Slab floors, heat losses from, BMS103

Slabs, concrete, tests, T291

Slag aggregates, coarse, R163
 roofing, specification, C158

- Slate, blackboard, R15
 built-up roofing, specification, C158
 permeability, T305
 physical properties and weathering characteristics, RP477
 roofing, R14
 structural, R13
- Slate-surfaced roofing and shingles, specification, C285
- Sleeve joints, lead-base, strength of, in copper tubing, BMS83
- Slip-casting process for preparation of crucibles, RP1236
- Slipperiness of fabrics, RP196
 floor and deck surfaces, BMS100
- Slip sizes, women's (woven fabrics), CS121
- Slopes of *pv* isotherms, RP1393
- Slushing oils, T176, C200
- Smokeless powder, S192, T98
- Snow loads, M179
- Soap, automobile, specification, C127
 chip, specification, C128
 composition and varieties, C383, C424
 grit cake, specification, C130
 hand grit, specification, C132
 liquid laundry, performance tests, T273
 liquid laundry, specification, C193
 liquid, specification, C124
 milled toilet, specification, C194
 ordinary laundry, specification C129
 powder, specification, C125
 powdered laundry, specification, C195
 salt water, specification, C126
 scouring compound, specification, C131, C370
 solutions, adsorption from, RP801
 solutions, surface tension, RP241
 specifications and test methods, C62, M15
 white floating, specification, C123
- Soda ash, specification, C314
 caustic (lye), specification, C315
 influence upon the temperature of liquid formation in cement mixtures, RP132
 laundry (washing), specification, C316
 phase studies with relation to portland cement, RP1699
- Soda-lime-silicate gels, compositions, RP1590
- Sodium bismuthate method, for determining manganese, S186
 carbonate, specification, C317
 chloride, effect on pH of borax buffers, RP1721
 chloride, effect on pH of buffers, RP1580
 manganurate, preparation and properties, RP1750
 oxalate as a standard in volumetric analysis, S178, S182, C40, C381
 oxalate in standardization of permanganate solutions, S182, RP843
 salts used in purifying and casting clays, T51
 silicate as quenching medium for steels, RP357
 spectrum, S312, RP4
 standard electrode potential, RP1350
 strontium galacturonate, preparation from beet pulp, RP1616
 strontium galacturonate, preparation from grapefruit peel, RP1617
 sulphate, action in synthetic tanning materials, T317
 sulphate, transition temperature, S68
- Softening point of bitumens, etc., determination RP142
- Soil characteristics, correlation with pipe-line corrosion, RP363
 corrosion of corrosion-resistant materials, RP1250
 corrosion of ferrous and nonferrous materials and nonbituminous coatings, RP1602
 corrosion of metallic coatings, RP982
 corrosion of metals, RP1446, RP1460
 corrosivity, electrolytic test, RP918, RP1157, RP1336
 corrosivity indicated by pipe-line currents and soil resistivity, RP298
 resistivity as indicator of corrosivity, RP298
- Soil-corrosion cells, electrode potentials and polarization, RP1336
 data, engineering significance, RP1171
 surveys, RP298, RP363
 tests, periodic reports, T368, RP95, RP329, RP359, RP638, RP883, RP945, RP982, RP1058, RP1250
- tests, pipe coatings, bituminous, RP1058
 tests, pipe-coatings, non-bituminous, RP982
 tests; soils, materials, and early observations, T368
- Soils, acid, corrosion of iron and steel, RP696
 alkali, effect upon cement drain tile, T44, T95, T214
 corrosion, RP450, RP1639
 determination of acidity, RP539
- Solar eclipse, radio observations, RP629, RP868
 heating of various surfaces, BMS64
 spectral-energy distribution, RP899
 wave lengths standard, RP11
- Solar radiation, effect upon balloons, T128
 evaluation of short-wave ultraviolet, RP877
 filter method, for measurement of extreme ultraviolet, RP318
 ultraviolet, RP1469, RP1542, RP1593
 ultraviolet, factors affecting intensities, RP816
 ultraviolet, in stratosphere, RP1075
 ultraviolet, in various localities, RP517
- Solar-radio correlations, RP1159
- Solarization of window materials by ultraviolet, RP113, RP744
- Solder, determination of tin in, RP1610
- Soldered joints in copper tubing, strength, BMS58
 joints in copper tubing, structural changes, RP1465
 seams, copper roofing, RP216
- Soldering of aluminum, magnesium, and their alloys, C346
- Solders for aluminum, C78
 lead-base, strength of sleeve joints in copper tubing made with, BMS83
- Sole leather, durability, T138, T147, T215, T286
 specification, C198
 wearing quality, RP1626
- Solenoids, resistance and inductance, S76, S169, S472, C74,
 coaxial, mutual inductance, S58, S59, S169, RP1178, C74
 formulas for the inductance of single-layer, RP16
 mutual inductance and torque between two concentric, RP24
 self-inductance, S84, S169, S455, S468, RP90, RP304, RP479, C74
- Solid-fuel-burning forced-air furnaces, CS109
- Solubilities of sucrose and dextrose in sugar mixtures, T259
- Solubility, cadmium sulfates, RP1389, RP1707
 colored glazes in organic acids, RP1196
 dextrose in water, S437
 glass, measurement by interferometry, RP1187
- Solvent, Stoddard (dry cleaning), CS3
- Solvents, organic, spectrophotometric detection of impurities in, RP1643
- Soot, effect on boiler rating, capacity and efficiency, BMS54
- Sorbose, mutarotation, RP1035
- Sound (architectural acoustics), T337, C300, C380, C396, C403, C418
 insulation of walls and floors, BMS17
 intensity measurements, S473
 transmission measurements, RP800
 transmission loss, field methods of determining, RP1388
 transmission through building materials, S506, S526, S552, RP48
 transmission through voice tubes, T333
 velocity in liquids by ultrasonic interferometer, RP402
- Sound-absorbent cylinders, absorption and scattering by, RP1709
- Sound absorption, acoustic material, effect of paint, RP1298
 air, RP465
 building materials, S526, C384
 oblique angles of incidence, RP149
 measurement, RP242, RP700
 measurement by automatic reverberation meter, RP457
- Soundproofing, airplane cabins, RP63
 apartment houses, T337
- Space heaters, oil-burning, CS101
- Spades, R48
- Spalling of firebrick, panel test for, RP1630
- Spar varnish, durability tests, RP146
 specification, C103

- Spark discharge of ignition systems, electrical character, RP1032
 gap, mercury, for photography, RP81
 photography in ballistics, S508
 plug electrode cements, T155
 plug, electrodes, nickel, T148
 test for steels, RP605
- Sparks, hazards from static, C438
- Specific gravity balance for gases, T89
 measurement, C16
 of sugar solutions, C457
 tables, C19
- Specific heat, (*see* particular substance)
 as a criterion of purity, RP1351
 and increases of entropy and enthalpy of synthetic rubber, GR-S, RP1595
 calorimeter, S301, S503
 of aluminum oxide, RP1797
 of 1,3-butadiene, RP1661
 of butene, RP1592
 of ethylbenzene, RP1684
 of hydrocarbon vapors, RP1640
 of isoprene, RP1044
 of synthetic rubber Hycar O. R., RP1487
 petroleum products, M97
 of rubber, RP844
- Specific refraction of glasses, RP1352
 volume of petroleum vapors, M97
- Specification of railroad signal colors and glasses, RP1688
 for blankets, RP1589
- Specifications (*see also* references under names of materials and commodities)
 and standards for metals and metal products, M120
 and standards, non-metallic minerals and their products, M110
 Commodity, National directory, M65, M130, M178
 Federal, for dental materials, C438
 Federal, manual, paint, with particular reference, BMS105
 for building construction, developing, BMS87
 for commercial weighing and measuring devices, H29
 for jar rings, M181
 for motion-picture projectors, C439
 in the wood-using industry, M79
 tolerances, and regulations for commercial weighing and measuring devices, M85 (*also* called H16), H22, H29
 U. S. Government master list, C319, C371, C378, M73
 U. S. Government Master (*see* subject reference for material and list of Circulars, especially C155 to C267 in C24, and C268 to C371 in supplementary list for July 1, 1925, to December 31, 1931. These specifications have been superseded by Federal specifications)
- Spectra, absorption, arsenic, antimony, bismuth, and nitrogen, S490
 absorption, carotin and xanthophyll, RP337
 absorption, iron, cobalt and nickel, S551
 absorption, plant pigments, RP617
 alkali metals, S505
 band, of chromium and vanadium oxide, RP423
 columbium, RP1656
 infrared absorption and reflection, S45
 infrared absorption, of hydrocarbons, RP610, RP1072, RP1769
 infrared arc, photographed with xenocyanine, RP473
 long-wave, of alkalis and alkaline earths, RP558
 mass of *cis*- and *trans*-2-butene, RP1775
 metal and gas, intensities, S19
 mixed gases, S4
 noble gases, RP710, RP781, RP1061, RP1790 (recombination), of cesium and helium, RP46
 scandium⁴⁶, beta and gamma ray of, RP1781
 secondary, S5
 stellar, photographing, S318
- Spectral absorption of monoazo dyes, RP47
 absorption, salt effect on β -naphthaquinonesulfonic acid, RP1424
 composition of searchlight arcs, T168
 distribution of energy, tables and graphs, M56; tables, M86
 distribution of energy to evoke the gray sensation, S417
 distribution of light emitted by plants and animals, S538
 energy distribution of a star, S438
 energy distribution of the carbon glow lamp, S132
 energy distribution of the firefly, S132
 radiation constants, (*see* Radiation constants)
 transmission of the atmosphere, S389
 transmission of various substances, S325, RP830
 transmittancy of dyes, S440
 Spectrograph, photographic, S422
 quartz rock salt, S441
 Spectrographic analysis, S444, RP1515
 of portland cement, RP1786
 of tin, RP1451
 of uranium-base materials, RP1753
 Spectrographic determination of alkalies in portland cement, RP1633
 of boron in steel, RP1705
 Spectrometer, in prism refractometry, RP64, RP-262
 mass, analysis of hydrocarbon and gas mixtures, RP1664
 Spectrophotometer, Beckman, performance, RP-1798
 pocket, S39
 Spectrophotometric detection of impurities in organic solvents, RP1643
 determination of rare earths, RP1395, RP1456
 measurements and tristimulus specification of color, RP1549
 and colorimetric determination of the colors of the TCCA standard color cards, RP1700
 Spectrophotometry, light sources, RP704
 photoelectric, by null method, S349
 Spectropyrheliometer, S378
 Spectroradiometric analysis of radio signals, S477
 Spectroradiometry, S279, S401, S418
 Spectroscopes, photometric attachment, S155
 Spectroscopic notes, S441
 Spectrum lines in polariscopic measurements, S34 (*see also* names of elements)
 acetylene flame, S279, S362
 aluminum, S411, RP4
 antimony, S411, S490
 argon, S414, RP540, RP710, RP781, RP1061
 arsenic, S490, RP116
 barium, S312, RP4
 bismuth, S411, S490
 bromine, RP172
 cadmium, S411, S441
 caesium, S312, S386
 calcium, S312, RP4
 carbon, RP1062
 carotin, RP337
 cerium, S421
 chlorine, RP73, RP570, RP1244
 chromium, S372, RP229, RP812
 cobalt, S324, S551
 columbium, RP793, RP881
 copper, S312, RP4, RP783
 dysprosium, S466
 gadolinium, S466
 gases, mixed, S4
 germanium, RP1266
 gold, S411
 hafnium, RP8, RP139, RP732
 helium, S146, S191, S302, RP462, RP710, RP-781
 hydrogen, S146
 iridium, S499
 iron, S251, S274, S324, S478, S479, S551, RP4, RP755, RP992, RP1062, RP1222, RP1288
 krypton, S345, S414, RP89, RP245, RP351, RP364, RP540, RP599, RP710, RP781, RP1061
 lanthanum, S421, RP468, RP497
 lanthanum oxide, RP273
 lead, S411
 lithium, S312
 lutecium, RP187, RP1008
 lutecium monoxide, RP1071
 magnesium, S312
 manganese, S372, RP4, RP564
 mercury, S411
 molybdenum, S372, S474
 neodymium, S442
 neon, S179, S191, S251, S329, RP540, RP710, RP781, RP1061
 nickel, S324, S551, RP4
 nitrogen, S490

(Continued on next page)

- noble gases, RP781
osmium, S499
palladium, S499
phosphorus, RP425
platinum, S499
potassium, S312
rare earths, S421, S466
rhenium, RP322, RP564
rhodium, S499
rubidium, S312
ruthenium, S499
samarium, S442
scandium, S549, S558
scandium oxide, RP273
silicon, RP624, RP1124
silver, S411
sodium, S312, RP4
strontium, S312
tantalum, RP589, RP671
tin, S411, RP1275
titanium, S372, RP4, RP1062
tubes, preparation, S441
tungsten, S372, RP1125
uranium, S372, RP1729
vanadium, S372, RP4, RP906, RP1317
vanadium oxide, RP423
xanthophyll, RP337
xenon, S345, S414, RP115, RP245, RP275, RP351, RP521, RP710, RP781, RP898, RP1164, RP1264
ytterbium, RP1053
yttrium, S421, RP12, RP55
yttrium oxide, RP273
zinc, S411
zirconium, S548, RP202, RP255, RP296
- Specula, method for silvering, C389
Speed, photographic, RP355
"Speedbrik" wall construction, structural, heat transfer, and water permeability properties, BMS86
Sphere, integrating photometric, S415, S447, RP3
Spherical aberration, RP52, RP102
thin lenses, S461
Sphygmomanometers, T352
Spice containers (tin and fiber), R170
Spin of a ball, measurement, RP1624
Spindle, mooring of airship Shenandoah, T270
Spinel, melting point of zinc, RP413
Spirals, steel, reinforcing, R53
Splices, reinforcing bar, behavior and strength, RP1669
Sponge rubber, properties, C377
Spools, metal; for annealing, handling, and shipping wire, R63
Sport shirt sizes, men's — woven fabrics, CS128
Spotlamps, vehicle, inner-controlled, CS82
"Spotting", fabrics, C383
Spotting, plated or finished metals, RP72
Springs, bedsteads, and mattresses, R2
Stability of structures, RP1163
Stain removal, from fabrics, C383
Staining of fibers for photomicrography, T217
Stainless iron, thermal expansion, S570
steel, corrosion tests, RP963
Stainless steel, tensile and compressive properties, RP1467
steel, thermal expansion, S426
Stair risers, hardwood, CS89
treads, hardwood, CS89
Stamp-pad ink, quick-drying, RP1087
specification, C185
Standard cell, Clark, S27, S67, S70, S390
comparator, RP586
Weston, S27, S67, S70, S71, S104, S220, RP518, RP588, M16
Weston, temperature formula, S104
Standard cells containing deuterium oxide, RP1094, RP1435
effect of glass containers on emf, RP588
effect of service temperature conditions, RP518
metastable forms, RP1389
temperature control, RP739
Standard Color Card of America, calibration, RP-1700
electrode potential of sodium, RP1350
gage, sheet iron and steel, C18
radio-frequency transmissions, RP630 (See also Radio-frequency)
resistors, stability, RP1692
sample benzoic acid, heat of combustion, RP1499
sample carbureter water-gas, analysis, RP1704
sample steels, nitrogen content, RP494
samples, C14, C25, C26, C40, C45, C66, C398
samples, issued or in preparation, C398 Supplement
samples, hydrocarbons, RP1744
samples, thermometric fixed points, C66
stock ponderosa pine doors, CS120
time conversion chart, M84
time throughout the world, C280, C399, C406
time zones of the United States and adjacent parts of Canada and Mexico, M111, M155
Standardization activities of national technical and trade organizations, M169
bibliography, M119, M136, M139
packages, M165
Standardizing agencies, See Standards Yearbook, M77, M83, M91, M106, M119, M133, M139, M169
Standards (see also particular subject or property)
Standards for caselining materials, M182
color, RP1549
electric, report to international committee, M16
electrical, international comparison of, RP448
gas service, C32, C405
international secondary, in the first spectrum of iron, RP1288
pH buffer, liquid-junction potentials, RP1632
Yearbook: 1927, M77; 1928, M83; 1929, M91; 1930, M106; 1931, M119; 1932, M133; 1933, M139
Standards and specifications, directory, M65, M130, M178
metals and metal products, M120
nonmetallic minerals and their products, M110
wood-using industries, M79
Standing waves on wires, S491
Staples and nails, wire, R223
Starch hydrolysis by enzymes, RP1599
laundry, specification, C383
potato, consisting, RP623
sweetpotato, suitability for sizing of paper M150
Stars, radiometric measurements, S244, S438, S460
Static electricity, C438
Steam, method for surveying thermal behavior, RP168
saturated, enthalpy, RP209, RP210
saturation pressure, RP523
tables, RP691
test of cement, T5, T43, T47
thermal properties, RP209, RP210, RP983, RP1228, RP1229
Steam-turbine expansion, S167
wheels, windage resistance, S208
Steatite fibers, elastic properties, S7
Steel, acid-electric, for castings, RP250
analysis, T6, T8, T24, T33, T69, T118, T126, T141, T207, C14
annealed eutectoid carbon, magnetic properties, S408
arc-fused, properties, T179
as affected by manganese, S464
Austenitic, magnetic balance for inspection, RP532
barrels and drums, R20
bars and bar-sized shapes, carbon, hot-rolled, R222
bars, color code for marking, R166
bond resistance, T173
Buildings Inc., "Steelox", structural properties, BMS12
carbon, changes in structure upon annealing, S397
carbon, effect of hot-rolling, T267
case-hardening normal and abnormal, RP14
castings, effect of deoxidation and mold conditions on tensile properties, RP199
castings, overreduced, RP250
cellular flooring, tests, RP463
centrifugally cast, T192
colorimetric determination of phosphorus, RP1386
columns, compressive properties of perforated cover plates for, RP1473, RP1474, RP-1501, RP1514, RP1527, RP1540
compression tests at elevated temperatures, RP741
corrosion protection, BMS8

(Continued on next page)

correlation of magnetic and mechanical properties, S272
damaging effect of fatigue stressing, RP1733
deep etching, T156
determination of boron, RP1120
determination of carbon in, T33, T69, RP240
determination of carbon monoxide and carbon dioxide in, T126
determination of chromium in, T6
determination of cobalt and manganese in, RP380
determination of cobalt in, RP445
determination of gases in, S346, S350, S457, T118, T126, RP976
determination of gases in, by vacuum fusion, S514, S563, RP346, RP1373
determination of hydrogen in, RP1373
determination of manganese in, RP109
determination of molybdenum in, RP453
determination of nitrogen in, S457
determination of oxygen in, RP1114, RP1115
determination of tin in, RP415
determination of vanadium in, T6, T8, S161
determination of zinc in, RP664
effect of carbon content on wear resistance, RP348
effect of rate of heating on austenitic grain size, RP1322
effect of service on endurance properties of rail, RP92
effect of zinc coatings on endurance properties, RP454
etched by ammonium persulfate, S402
eutectoid carbon, structure and magnetic properties, S404
floor constructions, BMS9, BMS10, BMS12, BMS15, BMS18, BMS46, BMS67
forgings, machinability, RP319
high speed, characteristics and heat treatment, S395
high-sulphur, determining carbon in, RP240
high-temperature protective coatings, RP1773
influence of oxide films on wear, RP708
iron, and bronze relief valves; bronze pop safety valves, R204
joists, open-web, R94
lockers, R35
low-carbon, tensile tests at high temperatures, T219
mild, microstructure at high temperatures, S356
nickel, properties, C58, C100
nickel, plating, RP1725
nitriding, RP126
nitriding, determination of aluminum in, RP533
one per cent carbon, mechanical properties, T206
open-hearth, cold-rolling tests, T288
painting, BMS102
partition constructions, BMS9, BMS11, BMS12, BMS18, BMS67, BMS74
pedestals, welded, stress distribution, RP232
pipe nipples, CS5
plate floor, strength, RP662
plates containing zirconium, T207
plates, effect of cold-rolling on hardness of surface layer, RP1484
production and properties, C409
properties of carbon tool, RP837
protection in low-cost housing, BMS44
protective plating, RP454, RP712, RP867
quenching, T295, T313
quenching with aqueous solutions, RP103
rail, deoxidation by titanium and silicon, T241
rails from sink-head and ordinary ingots, T178
rails, manufacture, T38
rails, service tests, RP1042
reinforcing bars, R26
reinforcing spirals, R53
residue methods of analysis, RP496
rifle-barrel, analyzed magnetically, S343
rivets, R221
roof construction, BMS9, BMS12, BMS46, BMS67, BMS74
roofing, R78
rustproofing, C80
safety valves, R201
scrap, classification, R58
screwed unions, CS7
shapes; structural, carbon, hot-rolled, R216
sheet, R28
sheet and plate, standard gage, C18
silicon, structural, T331
spiral rods, R53
stainless, tensile and compressive properties, RP1467
strain markings, RP15
structure of hardened and tempered, S452
surface hardness, RP1374
tanks, stresses, T243
tempering, S396
tempering and aging, RP707
tensile strength in relation to Brinell and Rockwell numbers, RP185
thermal expansion, S433
transformer, testing, S109
tubing, properties, T258, RP161
wall constructions, BMS9, BMS11, BMS12, BMS18, BMS27, BMS46, BMS67, BMS74
welds, tests, RP1444
windows, solid-section, R72
wire, effect of stress on magnetic properties, S496
Steel-joist floors, structural properties, BMS16, BMS51
"Steelox" building units, structural properties, BMS12
Steels, acid Bessemer, oxygen content, S346
alloy, containing rare elements, T207
alloy, creep at elevated temperatures, T362, RP192, RP481
alloy, tensile properties at high temperatures, T205, RP270, RP474
annealed carbon, grain size, S397
carbon, and iron-carbon alloy, influence of initial structure and rate of heating on austenitic grain size, RP1481
carbon, density, S562
containing vanadium, determining phosphorus in, T24
deterioration, in the synthesis of ammonia, T361
effect of lathe cutting conditions on the hardness of carbon and alloy, RP516
freezing temperatures, RP1375
hardened carbon, changes upon heating, S396
low-carbon, influence of phosphorus, T203
magnet, choice and utilization, S567
medium carbon, forging, effect of grain size and heat treatment on toughness, RP1410
nickel, critical ranges, S376
nitrogen in standard-sample, RP494
open-hearth, low-carbon, cold rolling tests, T288
open-hearth, low-carbon, influence of phosphorus, T203
quenching media, RP357
rail, T363, RP92, RP164, RP182
rail, secondary brittleness, RP408, RP409
resistance to abrasion, RP214
rivet, air-hardening, T358
spark test, RP605
Stefan-Boltzmann constant, σ , S262, S406, RP-1189
Stefan's formula for mutual inductance, S41
Stellar radiometry, S244, S438, S460
spectra, photographing, S318
temperatures, S438, S460
Stellite, reflecting power, S308, S342, S379, RP39
thermal expansion, S426
Stem correction of thermometers, S170, T49
Sterling silver flatware, R54
Stibnite, spectrophotoelectrical properties, S322, S398, S446, S462
ultraviolet reflecting power, S493
Still, chain-packed, RP579
continuous high-vacuum, for lubricating oil, RP1142
molecular, RP1739
molecular, behavior of rubber in, RP1202
with fritted glass plates, RP651
Stills, for fractionation, ball packings, RP1049
molecular and high vacuum, RP849
vacuum, for low-temperature distillation, RP45
with rectifying columns of glass, RP379
Stitches, sewing-machine, tests, T96
Stitching, specification, C283
Stockings, testing, RP753
Stoddard solvent (dry cleaning), CS3

Stomach tubes, specification, C220
 Stone, artificial dental, packaging, R117
 building, T305, T349, T350
 building, wear resistance, RP612
 cast, colors and finishes, CS53
 permeability, T305
 preservatives, T248, RP771
 stain removal and maintenance, T350
 Stones in glass, prevention, RP71
 Stopcock, control, for gas-analysis apparatus, RP130
 lubricant for distillation of petroleum fractions, RP379
 lubricants, solubility of gases in, RP661
 Stopcocks, glass, C430
 ground-glass, CS21
 Stop-lamps, electric, for vehicles, CS86
 Stop-watches, testing, C392, C432
 Stoppers, ground-glass, CS21
 Storage batteries, effect of cobalt and nickel, RP1335
 electromotive force and heat of reaction, RP1294
 internal resistance, S504
 sulphation of plates, T225
 vehicle type, operation and care, C92
 Storage battery acid, nitrates and nitrites in, T149
 electrolytes, RP566
 grid materials, RP567
 reactions, RP778
 separators, T271
 testing by cadmium electrode, T146
 Storage tanks, hot-water, R25
 Stove pipe and accessories, R190
 Strain, (*see also* Stress)
 data on perforated cover plates for steel columns, reduction of, RP1473
 determination of stresses from, RP559, RP851, RP1034
 elastic flat plate, RP1235
 gage for large strains, RP1658
 gage, electrical, T247
 gage, Whittemore, RP268
 gages, compensation for vibration and impact, RP1005
 lines developed by compressive tests on structural members, M72
 markings in steel, RP15
 measurements in reinforcement of dome, RP268
 measurements on girder hooks, T260
 measurements on rigid frames, RP1130, RP1161, RP1224
 measurements on steel tanks, T243
 test of 150-ton floating crane, T151
 Strain-stress curves of stainless-steel sheet, RP1467
 Strains between ceramic glazes and bodies, RP189
 Strap, bag, and case leather, CS34
 Stratosphere, cosmic-ray observations, RP1254
 measurements by improved radio sonde, RP1329
 measurements by radio meteorograph, Olland type, RP1169
 ozone distribution, RP1207, RP1367
 ultraviolet solar intensities, RP1075, RP1367
 Straws, production of paper pulp from, M124
 Streamline tierods, residual stress, RP1477
 Strength of brick, BMS60
 Stress, (*see also* Strain)
 analysis of rigid frames, RP1130, RP1161, RP1224, RP1431
 corrosion pitting, aluminum bronze and monel metal, RP1366
 distribution in steel columns, RP896
 distribution in vibrating propellers, method of measurement, RP556
 distribution in welded steel pedestals, RP232
 failure in welds, RP230
 generation in cooling glass, S513
 residual, in streamline tierods, RP1477
 tension members containing a circular hole, RP1235
 Stress-corrosion of bridge-cable wire, RP1604
 tests of aluminum alloy, RP1788
 Stress-deformation relation for concrete, RP970
 Stress-strain balance, autographic, RP1546
 curves for rubber, RP1256
 diagrams, columns, RP492
 measurements on wool fibers, RP1043
 relations of wet textiles, RP122

Stresses around a circular inclusion in rubber, photoelastic determination, RP1083
 bolts, RP386
 columns, RP831
 concrete frames, effect of brackets, RP189
 determination from measurements of strain, RP559, RP851, RP1034
 distribution in steel columns, RP1473, RP1474, RP1501, RP1514, RP1527, RP1540
 glass, relaxation, RP1637
 hardened tool steels, S513
 plates between steel H-sections, RP277
 rectangular plate, RP1450
 repeated, effect on magnetic properties of steel, RP26
 rotating propellers vibrating flexurally, RP1148
 stiffener plates for subway columns, RP218
 working, building code requirements, BH9
 Striae, electrodeposited silver, S195
 optical glass, S333, S373
 Strontium, critical potentials, S403
 spectrum, S312
 Structural Clay Products Institute, wall constructions, BMS24
 fiber insulating board, CS42
 Structural insulating board, R179
 members, axial rigidity, RP1737
 properties of low-cost house construction methods of determining, BMS2
 properties of prefabricated plywood light-weight constructions for walls, partitions, floors and roofs sponsored by the Douglas Fir Plywood Association, BMS104
 properties of "Speedbrik" wall construction sponsored by the General Shale Products Corporation, BMS86
 shapes, steel, carbon, hot-rolled, R216
 slate, R13
 steel angles, T218
 steel columns, fire tests, T184
 steel, high in silicon, T331
 tubing, tests, RP161
 Struts, spruce, compressive strength, T152
 Stucco, C311
 construction, durability, T70
 Stucco-faced walls, permeability, BMS41, BMS55
 water permeability and weathering resistance, BMS94
 Studies of binary and ternary combinations of magnesia, calcia, baria, beryllia, alumina, thorina, and zirconia in relation to their use as porcelains, RP1703
 Studs, milled, R169
 Styrene, heat of combustion, RP1628
 heat of formation and combustion, RP1629
 specific heat of vapor, RP1640
 Subway columns, bases for, RP218
 Sucrose analysis, RP1757
 determination, RP1417
 double-polarization method for estimating, S375
 hydrolysis by enzymes, RP1526
 invert, copper reduction, RP1638
 invert, Ofner method for determination, RP1757
 optical rotation, S52, S268, RP916
 reactions with chlorites, RP1408
 solubility in sugar mixtures, T259
 Sucrose and quartz, dispersion ratio, S268
 Sugar derivatives, optical rotation and hydrolysis, RP1274
 evaluation of Clerget divisor, S37
 extraction, diffusion battery, RP840
 industry, color in, T338
 levulose production, RP931
 mixtures, levulose yield, RP832
 Munson-Walker values, RP1301
 products, mercury arc in spectrophotometric analysis, RP38
 scale, comparison of French and International, RP916
 solutions, composition, RP534
 solutions for colorimetric analysis, preparation, RP536
 solutions, light absorbancy, RP878
 solutions, specific gravity by Baumé scale, T115
 solutions, spectrophotometric analysis, T338
 (Continued on next page)

- solutions, weights per gallon and cubic foot, C375, C457
test, flow manostat for, RP1492
use of chlorites in production, RP1436
- Sugars, acetyl derivatives, RP1663**
aldose, electrolytic oxidation, RP328
aldose, titration with standard iodine and alkali, RP247
bromine oxidation and mutarotations, RP1069
influence of atmospheric conditions in testing, S221
optical rotations and structures, S533, RP128, RP253, RP392
orthoacetate derivatives, RP1429
orthoacid derivatives, RP1021
oxidation in alkaline solution, RP1356
oxidation with bromine water, RP441
preparation of lower aldonic acids by oxidation in alkaline solution, RP1497
preparation of d-mannose, RP1357
preparation, nomenclature, mutarotation, and oxidation, RP969, RP990
reducing powers, RP1282
thermal mutarotations, RP892
- Sugars and sugar products, methods of preparation and analysis, C429**
- Suitcases, R215**
- Sulfate pulps in paper, T189**
resistance of portland cements, relationship of the garnet-hydrogarnet series, RP1411
- Sulfation of storage battery plates, T225, RP567**
- Sulfite cellulose extracts in tanning, T215, T339**
pulps in paper, T189
- Sulfoaluminates of calcium, RP54**
- Sulfocyanic acid, S54**
- Sulfonated oils, grading, CS43**
- Sulfonic acids, pH values and dissociation, RP1553, RP1559, RP1567**
- Sulfur, boiling point, S149, S339**
determination in rubber, T45
dioxide, analyses, S554
dioxide deterioration of cotton fabrics, RP294
dioxide, determination by thermal conductivity method, T249
dioxide, effect on paper, RP407, M128
dioxide, heat of formation, RP111
dioxide, removal from library air, M142
effect on red shortness of iron, T261
heats of reaction with rubber, RP791
in illuminating gas, T20
india rubber analysis, S174
ionization and resonance potentials, S400
nickel, T281
petroleum oils, T177
trioxide, determination, S554
in wool, RP885
- Sulfuric acid, adsorption by leather, RP249**
combination with hide substance, T317
consumption in storage batteries, RP778
effect on properties of leather, RP811, RP846
effect on wood, T271
electrical resistivity, RP738
in wool and water, RP673
solutions, density, S275
solutions, effect on properties of wool, RP980
solutions, solubility of mercurous sulphate, RP939
solutions, volatile organic acids in, RP267
specific gravity, C19
thermodynamic properties, RP1294
viscosity, RP566
- Sun, component radiations, S378**
- Sun glasses, blown, drawn, and dropped lenses, CS79**
ground and polished lenses, CS78
- Sundials, construction, C402**
- Sunlight, action upon lubricating oils, S153**
artificial, filters, M114
- Sunspots, comparison with ionosphere data, RP913**
radio transmission, RP1159
- Supercompressibility, corrections, RP170**
- Superconducting transition of tantalum and tin, RP977**
- Superconductivity, S307**
at radio frequencies, RP1070
- Supercooling of water, RP1105**
- Superheat meter for airships, T359**
- Superphosphate, determination of phosphorus, RP1010**
- Suppressors, effect on maxima of polarographic waves, RP1631**
- Supraconductors, distribution of current, S556**
- Surface determination of adsorbents, RP1496**
films, thickness, RP264
finish, evaluation, RP1625, RP1708
finish of steel, effect on protective value of electroplated coatings, RP1645
hardness of steel, effects of grinding, RP1374
layer, cold-worked, X-ray measurement of thickness, RP1494
layer of steel, effect of cold-rolling on hardness, RP1484
resistivity of insulators, S234
tension, measurement, S540
tension, optical glass, RP1771
tension, soap solutions, RP241
treatment for corrosion protection of steel, BMS8
treatment of steel prior to painting, BMS44
- Surge generators, current and voltage calculation, RP929**
- Surgeons' latex gloves, CS41**
rubber gloves, CS40
- Surgical dressings, R133**
gauze, R86
operating pads, specification, C245
- Surveyor's tapes, C238**
- Suspensions of electrical instruments, inelastic yield, RP105**
- Sweeping compounds, C383**
- Sweeps, floor, R88**
- Sweetpotato starch, suitability for sizing of paper, M150**
- Swiss pattern files, R206**
- Sybite, infra-red spectral transmission, S168**
- Sylvite, refractive indices, S401**
transmission, S168
- Synchronization, phase, in directive antenna arrays, RP581**
- Synchronizing recording apparatus, radio method, RP269**
- Synthetic resins for use on aircraft, RP1031**
rubber, measurement of densities, RP1507
rubber, properties, RP1487, RP1554, RP1507
rubber GR-S, specific heat and increases of entropy and enthalpy, RP1595
rubbers, composition, properties, and uses, C427
- Syringe, fountain, specifications, C250, C251**
- System, phase, (See Phase equilibria)**
- System soda-lime-silica-water at 25° C, RP1590**

T

- Tablecloths, cotton, specification, C351**
- Tables, mathematical (see list, page 219)**
school, R91
temperature interconversion, M126
- Tables of equivalents, weights and measures, M121**
- Tachometers, (aircraft), T237**
- Tacks, cut, R47**
- Tags, paper shipping, R93**
- Tail lamps, electric, for vehicles, CS84**
- Talbot's law, S26**
- Talc, thermal decomposition, RP848**
- Talcose ceramic whiteware, properties, RP1371**
- Talose, preparation, properties, and derivatives, RP1021**
thermal mutarotation, RP892
- d-Talose, action of baker's yeast on, RP1191**
phenyl glycoside of, RP1399
- d-Talosides, enzymatic hydrolysis, RP1369**
- Tangent modulus and column strength, T263**
- Tank, glass, small experimental, RP44**
stock lumber, cedar, cypress, and redwood CS92
- Tank-mounted air compressors, CS126**
- Tanks, expansion, R8**
gallonage tables, C416
porcelain-enamelled, for domestic use, CS115
stone, resistance to hypo solutions, RP864
storage, hot-water, R25
stresses in steel, T243
- Tanning agent for leather, iron as, RP1566**
extracts, thermal expansion, RP1612
extracts, vegetable, hydrometer correction tables and thermal-density coefficients, C449
materials, influence on durability of leather RP834, RP835, RP846
materials, synthetic, T302, T309, T316, T317, T339

Tannins, oxidation, RP1418
 Tantalum, radiation constant, S105
 rectifiers, T265
 reflecting power, S152
 spectrum, RP589, RP671
 superconducting transition, RP977
 thermal expansion, RP62
 thermoelectric properties, S120
 Tantalum and titanium, separation from aluminum, RP86
 Tape No. 1 Kraft paper sealing, R114
 rubber friction, specification, C229
 rubber insulating, specification, C230
 Taper roller bearings, R67
 tubes for filling cop winders, hole sizes, R153
 Tapes, testing of measuring, C2, C328, S534
 Taps, standard proportions, M89, M141, H28 (1944)
 Targets, outdoor, precision of telescope pointing, RP1717
 Tarnish resistance of silver alloys, T348
 Tarpaulins, and covers, cotton fabric tents, CS28
 tents, cotton, CS28
 Tautomeric equilibria of phenolsulfonic acids, RP1558, RP1567
 Taximeters, specifications and tolerances, M85, H22, H29
 Teeth, abrasion and solution decalcification, method of measuring, RP1563
 Telemeter, electrical carbon-pile, T247
 Telephone service, C112
 Telephonic transmission, influence of terminal apparatus, S101
 Telescope pointing for outdoor targets precision, RP1717
 reflector, glass disk for a 70-inch, RP97
 Telescopes, method for silvering specula, C389
 Telescopic objective, graphical solution, S461
 Temper colors of metals, RP1468, RP1470
 Temperature cabinet, constant, C453
 calculation of, from observations with a platinum thermometer, RP1647
 carbon arc, S8
 changes in dimensions of floor coverings with changes in, BMS85
 coefficients for proving rings, RP1726
 color, estimation, RP944
 color, scale, RP677
 compensation of millivoltmeters, RP926
 distribution in air, optical measurement, RP452
 distribution in a test bungalow with various heating devices, BMS108
 effect on crystallization of rubber, RP1718
 effect on dissociation of combined anions from wool, RP1377
 effect on leather, RP1319
 effect of small changes on properties of bodies, RP137
 estimates of Mars, RP1458
 incandescent lamps, S40
 interconversion tables, M126
 liquid copper, estimation by optical pyrometer, S121
 low, effect on properties of aircraft metals, RP1347
 measurement in ceramic kilns, T40
 measurements in Bessemer and open-hearth practice, T91
 measurements with electrolytic resistors, RP1126
 scale, S57, S69, S143, S260, RP22, RP99, RP1188, RP1189
 scale, 14° to 83° K, RP1188
 scale, International, RP22, RP1189
 scales, International comparison, 660° to 1063° C, RP573
 scale, International, reproducibility, RP1454
 scales, thermoelectric, RP99
 transition, of sodium sulfate, S68
 uniformity in an electric furnace, S219
 Temperature and luminosity, S133, S270
 Temperatures, attic, BMS52
 finishing, of rails, T53
 ocean, S210
 planetary and stellar, S438, S460, S512, S553
 summer, under insulated ceilings, BMS52
 surface, measurement, RP231
 Tempering, carbon steel, RP707
 steel, structural changes accompanying, S452
 steel, thermomagnetic study, RP350

Template hardware, builders', CS9
 Tennessee Coal, Iron and Railroad Company, "U.S.S. Panel-bilt" constructions, BMS74
 Tensile properties of alloy steels at high temperatures, T205
 properties of aluminum alloy, RP1788
 properties of nickel, copper, open-hearth iron, and alloy steels, RP1459
 properties of stainless-steel sheet, RP1467
 strength, electrical insulating materials, measurement, S471
 strength of manganese bronze exposed to corrosion, T135
 strength of mortar specimens, T276
 strength of parachute webbing, RP1710
 strength of steel, relation to Rockwell number, RP185, T334
 tests, boiler plate, at high temperatures, T219
 Tension, interfacial, of oils, T223
 meter, fabric, for use on aircraft, T320
 Tent duck for bleaching and dyeing, specification, C167
 Tents, tarpaulins, and covers, cotton, CS28
 Terminals, carbon brush (electric), M180, R210
 Terminology, grade, M173
 Terneplate, R30
 Terra cotta, moisture expansion, RP288
 Terra cottas, thermal expansivities, S485
 Terrazzo aggregates, physical properties, BMS98
 Terrestrial magnetism, relation to radio signals, S476
 Testing flameproofing methods, C455
 laboratories, commercial, directory, M90, M125, M171, M187
 machine, 100,000-pound dead-weight, RP147
 machine, 10,000,000-pound, RP108
 machines, calibration, RP1009
 machines, calibration with proving rings, C454
 machines, dead-weight, C446
 machines, effect of rate of loading on breaking strength of cotton yarns, RP1422
 machines, proving rings for calibrating, RP1726
 magnetic, C456
 weighing equipment, H37
 Testing and reporting, industrial mineral wool products, all types, CS131
 Tetramethylmethane, heat of combustion, RP1193
 2,2,4,4-Tetramethylpentane, boiling point and vapor pressure, RP1365
 preparation and properties, RP1306
 Textile Color Card Association color card standards, RP1700
 conference, second annual (1917), M19
 fibers, moisture relations at elevated temperatures, RP1303, RP1304
 materials, methods of testing, C293
 materials, testing and properties, C41
 Textiles, acidic and basic groups in, RP1314
 adsorption of soap, RP801
 aging test for silk, RP855
 chemical analysis, RP821
 compressibility, RP561
 device for determining coefficient of friction, RP1562
 effects of drying conditions, RP1337
 flameproofing of, C455
 flexural-fatigue, RP1485
 friction coefficient test, RP196
 heat insulation and air permeability, T266, T269
 hospital and institutional cotton, R74
 measurement of wrinkle ability, RP1077
 testing and reporting, CS59
 thermal transmission, RP1055
 wet, stress-strain relations, RP122
 Thallium, photo-electrical properties of halide salts, S456
 Thalofide, spectrophotoelectric sensitivity, S380
 Theatre proscenium curtains, tests, RP603
 Thermal ammeters, S206
 analysis by modified Rosenhain furnace, S348
 analysis, inverse-rate method, S336, T320
 analysis, nickel steels, S376
 behavior of kaolin minerals, RP792
 conductivity of irons and steels, RP669
 density coefficients of vegetable tanning extracts, RP1612
 insulation of buildings, C376
 radiation standards, S227, RP578
 transmission of blankets, RP1528, RP1529, RP1589

- Thermal expansion (*see also* Expansion, thermal) apparatus for measuring, RP1668
barium-strontium titanate, RP1776
bronzes, RP1518, RP1550
concrete aggregate material, RP1578
glass, RP1730
high-silicon cast iron, RP1581
indium, RP1541
iron, RP1597
mica, RP1675
titanium, RP1520
zirconia, effect of some oxide additions on, RP1662
- Thermal properties, (*see specific materials*)
copper alloys, RP1518, RP1550
moist fabrics, RP1587
- Thermal-expansion stresses in plastics, RP1745
- Thermochemistry, hydrocarbons, RP1728
paraffin hydrocarbons, RP1607
- Thermocouple materials, testing, RP768
- Thermocouple and filter radiometer as dosage intensity meter, RP450
- Thermocouples, calibration at low temperatures, RP1339
calibration at silver point, RP557
chromel-alumel tables, RP767
cold-junction corrections, S202
copper-constantan, RP1080
iron-constantan, tables, RP1080
measurement of stellar heat, S188, S229, S244, S438, S460
platinum-rhodium, tables, RP530
stability of base metal, RP1278
- Thermodynamic properties, acetylene hydrocarbons, RP1682
alkylbenzene hydrocarbons, RP1732
ammonia, tables and Mollier chart, C142
1,3-butadiene, RP1661
butadiene reactions, RP1747
butene, RP1592
concentration cells, S165
ethylbenzene, RP1684
mixtures of *o*-phthalic acid and potassium hydroxide, RP1678, RP1687
monoolefins, RP1738
reactions for producing liquid hydrocarbon fuels, RP1634
saturated steam and water, RP983
some reactions involving O_2 , H_2 , H_2O , C , CO , CO_2 , CH_4 , RP1634
water, 0° to $374^\circ C$, RP1229
- Thermodynamic quantities, dissociation of *p*-phenolsulfonate ion, RP1559
scale of temperature, S57
temperature of ice point, S57
temperature scale, high temperatures, RP1189
- Thermodynamics, chemical of hydrocarbon, RP1728, RP1732, RP1738
transformations of equations, RP1605
- Thermoelectric measurement of critical ranges of pure iron, S296
power of molybdenum-copper, S152
power of pure rhodium, RP127
properties of platinum-rhodium alloys, RP537
properties of tantalum and tungsten, S120
temperature scales, RP99
temperature scales, international comparison, RP573
- Thermoelectromotive force in galvanometer branch of a potentiometer circuit, RP1194, RP1195
- Thermoelements, protected, S276
- Thermomagnetic analysis, apparatus, RP50
investigation of tempering of steel, RP350
- Thermometer comparator, S69
compensated contact, RP231
differential, for airships, T359
gas, constant-pressure, S57
- Thermometers, aircraft, T237
calorimetric resistance, S200
capillary, S170
clinical, CS1
clinical, testing, C5, S13
coiled filament resistance, RP508
mercurial, heat treatment, S32
mercurial, stem correction, S170, T49
platinum resistance, S68, S124, S294, S407
resistance, calibration between 14° and $83^\circ K$, RP1188
- resistance, electrical conduction in glass insulation, RP1466
resistance, intercomparison between -190° and $445^\circ C$, RP1454
testing, S13, C8
thermometric lag of aircraft, RP222
- Thermometric lag, S185
- Thermometry, gases, RP1393
resistance, wheatstone bridge for, S241, S288
- Thermopile, absolute, S261
- Thermopiles, bismuth-silver, S229
vacuum, S188, S282, S413
- Thermoregulator, photoelectric cell, RP284
- Thickness, enamel coatings, RP1315
measurements of metal coatings, RP866, RP1081, RP1240
measurements of metal coatings, magnetic method, RP1081
measurements of zinc and cadmium coatings, dropping tests, RP1240
- Thinner, composite, specification, C102
paint, volatile mineral spirits, specification C98
volatile, in oil varnish, T76
- β -Thiophenyl *d*-glucoside, enzymatic hydrolysis, RP1369
- Thomas recording gas calorimeter, RP519
- Thomson bridge, S181, S225
galvanometer, S282
- Thoria systems and porcelains, RP1703
- Thorium oxide resistors for furnaces, RP1443
- Thread-locking devices, RP386
- Threads, screw, special, CS25
standard, CS24
- Thulium, spectrophotometric determination, RP1456
- Tierods, residual stress, RP1477
- Ties for cavity walls, strength and resistance to corrosion, BMS101
- Tile, asphalt, R225
boards, fiber, properties and performance, BMS77
cement, in alkali soils, T44, T95, T214, T307
concrete, building, C304
fire resistance of hollow load-bearing wall, RP37
gypsum, manufacture, C281
hollow building, R12
hollow building, tests, T120
hollow clay floor, specification, C344
hollow clay load-bearing wall, specification, C342
hollow clay partition and furring, specification C343
moisture expansion, RP288
walls, strength, T238, T311, RP310, RP972
walls, strength of interlocking-rib, T366
- Tile and concrete beams and slabs, T220, T236, T291, RP181
- "Tilecrete" floors, structural properties, BMS16
- "Tilecrete Type A" floor construction, structural properties, BMS51
- Tiles, clay, for floors and walls, R61
- Time conversion chart, M84
intervals, production of accurate, RP1136
standard, throughout the world, C280, C399, C406
zones, standard, United States, Canada, and Mexico, M111, M155
- Timepieces, testing, C432
- Tin boiler plugs, T53, RP129
coating on sheet copper, T90
conservation in alloys, T109
determination in irons and steels, RP415
determination in nonferrous alloys, RP1610
distillation and determination, RP1116
separation by distillation as chloride, RP871
spark spectrographic analysis, RP1451
spectrum, S411
superconducting transition, RP977
ultraviolet reflection, RP141
- Tin-lead alloys, properties, RP248
- Tin-lead-bismuth-cadmium alloys, C388
- Tinting strength of pigments, RP7
- Tinware, galvanized and japanned ware, R55
- Tips, rubber, crutch, specification, C223
- Tire fabric testing, T68
repairs, vulcanized, CS110
treads, wear, RP1574

- Tires, automobile, power losses, T213, T240, T283
 automobile, use and care, C341
 effect on fuel consumption, T283
 endurance tests, T318
 industrial truck, R103
 puncture sealing, C320
 railway, foreign specifications, T61
 rubber, specifications, C115
 truck and automobile, treading, CS108
 wear of tread, RP2
 wearing qualities as influenced by reclaimed rubber, T294
- Tissue paper, R46
 waxed, R125
- Titanium as a deoxidizer of rail steel, T241
 dioxide, phase equilibria, RP648
 dioxide, properties, RP619
 pigment, specification, C163
 spectrum, S372, RP4, RP1062
 thermal expansion, RP1520
 zinc paint, specifications, C215
- Titanous chloride, separation of rhodium from iridium, RP489
- Titration curves of formic and acetic acids, RP1537
 curves of wool and of egg albumen with various acids, RP1377
 curves of wool, effect of temperature, RP1343
 silk fibroin, RP1360
- Toggle clamp for testing rubber specimens, RP1204
- Toiletries and cosmetics, paper boxes for, R200
- Toilets, metal partitions, R101
- Tolerances, commercial weighing and measuring devices, M85 (also called H14), H22, H29
 sheet metal, C391
- Toluene, determination, RP280
 heat of combustion, RP1629
- Toluol recovery, T117
- Tool steels, carbon, hardening, RP837
- Tools, forged, R17
 tungsten carbide, cutting tests, RP206
- Topographic mapping, calibration of airplane cameras, RP1428
- Torque between concentric solenoids, RP1208
 electrical instruments, S145
- Torsion of a rubber cylinder, RP1802
- Towels, huck, specification, C313
 paper, C294, C407
 terry, fast-selva, (turkish), R119
- Tracing cloth, transparency, C63
 ultraviolet transmission, RP113
- Track scales, railroad, specifications, C333
 railway, for light industrial service, specifications, C386
- Trade organizations, standardization activities, M169
- Traffic paints, properties, RP1007
 signal light colors, RP1565
- Transfer instruments, ac-dc, RP1344
- Transference number, moving boundary method for measuring, RP428
 number of a salt, RP314
- Transformations, alloy steel, S335
 fundamental thermodynamic equations, RP1605
- Transformer method for measuring high alternating voltages, RP1079
 oils, minerals, T13
 steel, S109
- Transformers, accuracy of current, RP775
 air-core, S449
 current, effect of wave form on performance, RP1041
 current, equipment for testing, RP580
 design, C408
 formulas for ratio, regulation, and phase angle, S116, S211
 instrument (current), S116, S130, S164, S233, S309, C20
 instrument (potential), S116, S130, S217, S233, S516, C20
 instrument, watt-hour-meter method of testing, S233
 iron losses, S88, S109
 potential, regulation and magnetizing current, S129
 standard specifications, C22
- Transition, heat of, of graphite into diamond, RP1620
- Translation waves, effect of turbulence and channel slope on, RP1544
- Transmission formulas, radio, S159, S326, S353, S354
 infrared, of standard optical materials, S401
 infrared, of various substances, S325, S418, S440
 Line Loading Charts, NESC, M176
 measurements on Beckman spectrophotometer, RP1798
 measurements, spectral, RP30
 radiotelegraphic, S226
 sound through partitions, S506, S552
 spectral, of the atmosphere, S389
 visible and ultra-violet, of colored glasses, T148
- Transmission-reflection relationships in sheet materials, RP1430
- Transmittancy, spectral, of dyes, S440
- Transmitter, electron tube, of modulated waves, S381
- Transparency, paper and tracing cloth, C63
 standards, RP709
- Transverse test bars, preparation, RP880
- Traps and bends, lead, CS96
 lavatory and sink, R21
- Trays, food, or dishes (waxed paper, molded wood pulp, and wood types), R187
- Treading of automobile and truck tires, CS108
- Treads, tire, wear, RP1574
- Tricalcium aluminate, crystal structure, RP1437
 aluminate in portland cement clinker, RP910, RP917, RP1358
 silicate, decomposition by heat, RP381
- Trihydroxyglutaric acid, preparation of potassium salt of galacturonates, RP1680
- Trim, doors and frames; for hollow metal single acting swing doors, R82
 doors and frames; for kalamein single acting swing doors, R83
 interior, hardwood, CS76
- 2,2,3-Trimethylbutane, boiling point and vapor pressure, RP1365
- 1,2,4-Trimethylcyclohexane in petroleum, RP1173
- 1,1,3-Trimethylcyclopentane in petroleum, RP1800
- Trimethylpentane, freezing point, RP469
- 2,2,4-Trimethylpentane boiling point and vapor pressure, RP1097, RP1280
- 2,2,3-Trimethylpentane, physical properties, RP-1259
- Trioxane, dipole moment, RP1596
- Triple point and boiling point of nitrous oxide, RP1644
- Triple point of water, RP658
- Trisodium phosphate, reclamation of gasoline, T280
 specification, C369
- Triton F as cellulose solvent, RP1441
- Tropical atmosphere, cabinet for maintaining, C453
- Trough, eaves, and conductor pipe, and fittings, R29
- Truck tires, industrial, R103
 treading, CS108
- Trunks, R215
- Tube, water, copper; and pipe, brass and copper, R217
- Tubes, colon, rubber, specification, C221
 electron or vacuum, (see Electron tube)
 lavage or stomach, specification, C220
 paper, for packaging milk-bottle caps, R218
 paper, for textile winding, R143
 taper, for filling cop winders; hole sizes, R153
 voice, T333
- Tubing, brass, internal stress, T257, T285
 copper, bonding layer of soldered joints, RP1465
 copper, strength of lead-base sleeve joints in, BMS83
 copper, strength of soldered joints, BMS58
 gas, flexible, T133
 rubber, specification, C305
 steel, electrically welded, RP161
 steel, strength, T258
- Tubing and cotton jersey cloth for work gloves, R194
- Tubs, butter, wooden, R135
- Tucks packing, specification, C233
- Tumblers, commercial laundry, R141
 flint-lime glass, specification, C119

Tungsten carbide-cobalt mixtures, thermal expansion, RP960
 carbide, lathe cutting tests, RP206
 filaments, straight and helical, emissivity, S300
 reflecting power, S152, S308
 selective radiation, S131
 spectrum, S372, RP1125
 thermal expansion, S515
 thermoelectric properties, S120
 Tungsten-filament lamps, characteristic equations S238, RP502
 color-temperature changes, RP937
 photometry, S277, RP699
 Tungsten-in-quartz lamp, application in photoelectric radiometry, RP1543
 Tuning fork, calibration, RP144
 use in frequency measurement, S489, RP220
 Turanose, hydrolysis in alkaline solution, RP1356
 Turbidimeter, in sulfate determination, RP893
 Turbidity standard of water analysis, S367
 Turbulence, boundary layer, production of, RP1772
 Turbulence and channel slope, effect of translation waves on, RP1544
 Turbulent flow in channels, RP1151
 Turkish towels, R119
 Turn indicators, T237
 Turnbuckles, R71
 Turning with shallow cuts at high speeds, RP120
 Turpentine, density and thermal expansion, T9
 specification, C86
 "Twachtman" walls and floors, structural properties, BMS20
 Twin-bomb calorimetry, RP470
 Twine, cotton, polished, R124
 flax and hemp, R136
 hard fiber, R92
 soft fiber (jute), R110
 Twist, cotton yarn, T278, RP27
 rayon yarns, RP361
 yarn, effect on properties of cotton cloth, RP861, RP862
 Two-phase system, vapor-corrections in, RP1693
 Type metals, RP248
 Typewriter ribbons, manufacture and testing, C431
 specification, C186
 Tyrosine in silk fibroin, combination with KOH, RP1360
 methylation in proteins, RP1338

U

U bars, vibration, RP293, RP443
 Ubbelohde viscosimeter, T125
 Ulbricht integrating sphere, theory and construction, S447
 sphere for measuring reflection factors, S415
 Ultimate rays of Zr I, RP296
 Ultrasonic interferometer for sound velocity measurements in liquids, RP402
 Ultraviolet absorption spectrum of potassium *p*-phenolsulfonate, RP1558
 intensity meter, calibration, RP517, RP877
 intensity meter, portable, RP647
 intensity meter, thermocouple and filter as, RP318, RP370, RP450, RP877
 radiation from quartz mercury vapor lamps, S330, S378
 radiation standard, RP858
 reflecting power, aluminum, duralumin, rhodium, tin, RP141
 reflecting power, beryllium, chromium, cobalt, nickel, silver, speculum metal, stellite, stainless steel, RP39
 reflecting power, pyrites, stibnite, molybdenite, graphite, galena, duralumin, S493
 solar intensities in stratosphere, RP1075, RP1181, RP1207
 solar radiation, S378, RP113, RP318, RP517, RP816, RP877, RP1075, RP1207, RP1469, RP1542
 solar and sky radiation, RP1593
 solar spectral energy distribution, RP877, RP899, RP1207
 spectra and dissociation constants, RP1686
 spectral erythemal reaction of skin, RP433, RP631
 spectrophotometry, RP33
 transmission changes in window materials, RP113, RP345, RP744
 transmission of colored glasses, T93, T119, T148
 transmission through fabrics, RP6

transmitting glasses, restoration of solarized, RP345
 Underground corrosion (*see also* Corrosion and Soil corrosion), RP1639, C450
 Underwear fabrics, properties, RP711
 knit, CS33
 Unions, screwed, malleable iron or steel, CS7
 United States Army Color Card, calibration, RP1700
 Units, electrical, International, S3, S102, S292, C29, C60, M16
 electromagnetic and electrostatic, S65, S66, RP83
 length of electromagnetic waves, M117
 light, International, C15
 photometric, S141, C15
 Units of weight and measure, C47, M121, M135
 Upholstery leather, specification, C212
 Uranium spectrum, S372, RP1729
 Uranium-base materials, spectrographic analysis RP1753
 Uranyl acetates, properties, RP672
 Uronic acid in cotton fibers of various ages, RP1326
 acids in cellulosic materials, RP1268
 "U.S.S. Panelbilt" sheet-steel constructions for walls, partitions, and roofs, BMS74
 Utensils, cast aluminum, cooking (metal composition), CS134
 porcelain-enameled steel, CS100
 Utility commission engineers, conference, M58, M66

V

Vacuum-fusion method, gases in metals, RP346
 hydrogen in steel, RP1373
 oxygen in simple and alloy steels, RP1114, RP1115
 Vacuum tube (*see* Electron tube)
 acceleration pickup, RP1754
 three-electrode, input impedance, S351
 Valence electrons of uranium, RP1729
 Valves, brass or bronze (gate, globe, angle, and check), R183
 iron (angle, check, gate, and globe), R184
 pop, safety, bronze, R204
 pop safety, iron and steel, R201
 regulating, automatic, R219
 relief, iron and steel; for petroleum, chemical, and general industrial services, R205
 rubber, specification, C244
 wrought-iron and wrought-steel, R57
 Vanadium, determination in steels, S161, T8
 oxide, band spectrum, RP423
 separation from aluminum, RP86
 separation from chromium in steels, T6
 spectrum, S372, RP4, RP906, RP1317
 steel, etching methods and solutions, S518
 Vane anemometers, effect of airstream inclination, RP1056
 Van Slyke method of gas analysis, RP680
 Vapor barriers, effect on the transmission of condensation in wall specimens, BMS106
 corrections in calorimetry, RP1693
 pressure and condensation in wall specimens, BMS106
 pressure of 1,3-butadiene, RP1661
 pressure of carbon dioxide, RP538
 pressure of ethylbenzene, RP1684
 pressure of nitrous oxide, RP1644
 pressures and boiling points of hydrocarbons, RP1670
 Vapors, saturated, formula for density, RP616
 Variance of measuring instruments, S328
 Variometer, (*see* Inductor, variable)
 Varnish, accelerated tests, RP1
 asphalt, specification, C104
 brushes, R43
 determining oil and resin in, T65
 durability, RP146, RP333
 interior, specification, C117
 materials, C69, BMS105
 shellac, T232
 shellac, calculation of "cut", RP1333
 shellac, specification, C303
 spar, specification, C103
 Varnishes, paints, and related products, shades and containers, R144
 Vegetable cans, R155
 tanning extracts, thermal density coefficients and hydrometer correction tables, RP1612

Vegetable-tanned sole leather, wearing quality, RP1626
 strap leather, effect of mildew, RP1713
 Vegetables, canned, corrugated and solid fiber boxes for, R146
 Vehicle lights and signals, electric:
 adverse-weather lamps, CS81
 clearance, markers, and identification lamps, CS83
 direction-signal systems, CS80
 license-plate lamps, CS85
 liquid-burning flares, CS88
 models, air resistance and ground effect, RP748
 spotlamps, inner-controlled, CS82
 stop lamps, CS86
 supplementary driving and passing lamps, CS97
 tail lamps, CS84
 tanks, specifications and tolerances, M85, H22, H29
 warning lanterns, CS87
 Velocity, flames, RP900
 light, and electric units, S65, RP83
 projectiles, S508, T255
 Velour, cotton and rayon, CS103
 Veneers, walnut, CS64
 Venetian blinds, wood slat, CS61
 Ventilation, of dwellings, BMS107
 Venturi meters, tests, RP335
 tubes, C309
 Verilite, thermal expansion, S497
 Veritas firing rings, T40
 Vibrated concrete, properties, RP1048
 Vibration, aircraft propellers, RP678, RP764
 building walls, theory, RP1388
 concrete, measurement, RP1101
 electrometer, S239
 galvanometer, S14, S134, S370
 U bars, RP293, RP443
 Vibration and impact, compensation of strain gages, RP1005
 Vibrational frequencies of molecules, RP1758, RP1768
 Vibrations, excitation, RP556
 quartz plates, experimental studies, RP356
 rotating propeller blade, RP1148
 Vibrators for fabricating mortar cubes, RP1273
 Victor-Meyer apparatus, improved, RP215
 Vignetting losses of a photographic lens, compensation by aperture ratio markings, RP1803
 Vinyl resin films, durability, RP146
 Viscometer, factors affecting results obtained with the Mooney, C451
 Redwood, T210
 Viscometers, calibration, S298
 Viscose photographic film, stability, RP1134
 rayon, blankets, properties, RP1589
 Viscosimeter, Saybolt, T112
 Ubbelohde, T125
 Viscosimeters, short-tube, T100
 Viscosity, cuprammonium solutions of cellulose, RP1179
 gasoline, T125
 glass, S358, RP1730
 glass and plastics, RP1637
 greases and oils at low temperatures, RP188
 optical glass, RP577
 porcelain bodies, T30, T50
 relation to electrical resistivity of sulphuric acid, RP738
 relation to heat effects in glass, RP1734
 Saybolt, of blends, T164
 sulphuric acid, RP566
 water, sucrose, and ethyl alcohol solutions, S298
 Vises, machinists', efficiency, RP91
 Visibility function, interpolation, RP289
 incandescent and neon flashes through fog, RP78
 radiant energy, S154, S303, S475, RP289
 tables for calculation, M86
 Vision, protanopic and deuteranopic, RP1618
 Visiting Committee report, 1923, M63
 Visitors' manual, National Bureau of Standards, M93, M134, M153, M160
 Vitamin C content of blood, RP1364
 preparation from beet pulp and pectic substances, RP1594
 Vitreous china plumbing fixtures, staple, CS20, R52
 enamel slips, T356
 enamels, blistering, RP179
 enamels, surface tension, RP1133
 ware, specifications, C310

Vitrification of clays, T17, T79
 Vitrified paving brick, R1
 Voice modulation, radiotelephony, S423
 tubes, T333
 Volatility of motor fuels, RP694
 Volatilization, distillation with perchloric acid, RP1198
 platinum, S280
 Volt boxes, testing and performance, RP1419
 International, C29
 Voltage compensator, vacuum-tube, RP1312
 dividers for cathode ray oscillographs, RP460
 dry cells, and hydrogen-ion concentration, S364
 optimum, for airplanes, RP1247
 transformer, testing, S516
 Voltmeter, silver, S2, S102, S171, S194, S195, S201, S220, S240, S271, S283, S285, M16
 Voltmeters, silver and iodine, S218
 Voltmeter, corona, experimental study, RP21
 electrostatic, RP217, RP404
 suppressed-zero electrodynamic, RP105
 synchronized oscillator as a, RP1780
 Voltmeters, C20
 switchboard, S163
 Volume change of rubber on stretching, RP936
 control, automatic, for aircraft radio receivers, RP330
 correction factors for gasoline, RP393
 petroleum asphalts at 60° F, M97
 Volume-temperature relationship of rubber, RP717
 Volumes, liquid, weight burette for micromasurement, S555
 Volumetric apparatus, glass, testing, S92, C9, C434
 tables, standard, C19
 Vulcanization, guayule rubber, T353
 rubber hydrocarbon, RP720
 Vulcanized tire repairs, CS110
 Vycor brand glass, thermal expansion, RP1445

W

Waidner-Burgess standard of light, RP325
 Waidner-Wolff resistance elements, RP842
 Wainscots, magnesia cement, specification, C323
 Waists, boys', CS14
 Walden inversion, mechanism, RP1429
 Walkway materials, measuring frictional coefficients, RP204
 Wall construction, fiber insulating board, BMS97
 minimum requirements for masonry, BH6
 "Speedbrik", structural, heat transfer, and water permeability properties, BMS86
 wood frame, structural properties of "Precision Built, Jr." prefabricated, BMS89
 Wall paneling, hardwood, solid, CS74
 paper, CS16
 specimens, laboratory observations of condensation in, BMS106
 tile, fire resistance of hollow load-bearing, RP37
 vibration, theory, RP1388
 Wallboard, fiber, CS112
 fiber, properties, M132, BMS13
 gypsum, manufacture, C281
 gypsum, specification, C211
 Walls, brick and tile, compressive strength, RP972
 brick, permeability, BMS41
 brick, structural properties, BMS23, BMS24, BMS53
 brick-concrete-block, and concrete-block, structural properties, BMS32
 brick-tile, structural properties, BMS24
 building, moisture in, BMS63
 built of masonry units, water permeability, BMS82
 cavity, strength and resistance to corrosion of ties for, BMS101
 clay brick, compression tests, RP108
 concrete block, structural properties, BMS21, BMS38
 concrete monolithic, BMS61
 concrete unit, structural properties, BMS20, BMS22, BMS39, BMS40
 earth, structural properties, heat-transfer, and water permeability, BMS78
 frame construction, accumulation of moisture in, BMS93
 hollow tile, strength, T238, T311, RP310
 interior surfacing with fiber insulating board BMS97

(Continued on next page)

- interlocking-rib tile, strength, T366
masonry, effect of outdoor exposure on water permeability, BMS76
masonry, structural properties, BMS5
reinforced-concrete, structural properties, BMS-26
sand-lime brick, compressive strength, T276
sound insulation, BMS17
steel, structural properties, BMS9, BMS11, BMS12, BMS18, BMS27, BMS46, BMS-67, BMS74
structural and heat-transfer properties of "Multiple Box-Girder Plywood Panels" for, BMS99
structural properties of "PHC" prefabricated wood-frame construction for, BMS90
stucco-faced, gunite-faced, and "Knap-Concrete-Unit", water permeability and weathering resistance, BMS94
unit-masonry, waterproofings for, BMS95
water permeability, BMS7
white, in a photometric laboratory, S20
wood-frame, structural properties, BMS25, BMS30, BMS31, BMS36, BMS42, BMS-47, BMS48
wood-plank, structural properties, BMS37
Walnut veneers, CS64
War housing, recommended building code requirements, BMS88
maps, experimental manufacture of paper for, RP1751
work of the Bureau of Standards (1917-18), M46
Warehouse forms, R34
Warm-air furnaces equipped with vaporizing pot-type oil burners, CS104
Warning lanterns, red electric, for vehicles, CS87
Washers, commercial laundry, R142
Washing materials, C383, C424
soda, specifications, C316
Waste, colored cotton, specification, C263
farm products, utilization, M123, M124, M147, M148, M150
silk, use, T268
white cotton, specification, C262
wool, colored, specification, C260
Watches, elinvar hairsprings, RP670
testing, C51, C392, C432
Water analysis, turbidity standard, S367
current meters, performance, RP981
density and refractive index, RP971
determination, S267
determination of, in acetanilide, benzoic acid, and potassium dichromate, RP1600
dissociation constant at 30° C, RP584
enthalpy and latent heat of vaporization, RP209, RP210
flow in open channels, equation of motion for steady mean flow, RP1488
flow through porous solids, RP88
heat of formation, RP259, RP343
heat of fusion, RP1260
heat of ionization, RP309
heat of vaporization, RP416
heavy, heat and free energy of formation, RP1287
heavy, isotopic fractionation, RP729
hydrogen-ion concentration, RP634
laundering, C383, C424
of crystallization, radiometric investigation, S168
of masonry walls, BMS7, BMS41, BMS55
permeability and weathering resistance of stucco-faced, gunite faced, and "Knap-Concrete-Unit" walls, BMS94
permeability of "Speedbrik" wall construction, BMS86
permeability of walls built of masonry units, BMS82
preparation of heavy and light, RP601
properties of isotopic forms, RP703
reaction on calcium aluminates, RP34
recovery in aircraft, T293
refractive index and dispersion, RP934, RP1085
repellency of fabrics, RP1762
specific gravity, C19
specific heat, S247
standard for ebulliometry, RP1088
supercooling and freezing, RP1105
supplies, over-rim, prevention of backflow, BMS28
thermodynamic properties, RP209, RP210, RP-983, RP1228, RP1229, RP1634, RP1747
vapor adsorption of leather, RP1763
vapor detector, T242
vapor pressure, RP523, RP691
vapor, psychrometric charts, M143, M146
Water-closet bowls, seats for, CS29
Water-dioxane system, boiling-point, composition diagram, RP985
Water-distributing systems for buildings, BMS79
Water-filtration coefficient of filter paper, RP1613
Water-gas, carburetted, analysis of standard sample, RP1704
reaction, heat and free energy, RP1192
Water-vapor permeability of materials, apparatus for determining, C453
permeability of membranes, M127
Waterproofed paper, T312
papers, stability, BMS35
Waterproofing, floor coverings, BMS59
masonry walls, BMS7, BMS95
material for mortar and concrete, specification, C322, C360
materials, colorless, for stone, T248
materials for concrete, tests, T3, RP394
materials for masonry, RP771
walls and roofs, specifications for various materials, C155, C156, C160, C161, C162, C287
Waters, natural, isotopic composition, RP656
Watt-hour meter, C20
direct-current, S207
method of testing transformers, S233
Wattmeters, S48, S184, C20
integrating, effect of frequency and wave form, S21
standard electrodynamic, RP1344
Watts-per-candle meter, S113
Wave form analysis, S203
effect on performance of current transformers, RP1041
effect on X-rays, RP592
influence on rate of wattmeters, S21
magnetic flux, S87
Wave form and losses in magnetic hysteresis, S106
transformers, S88
Wave front, radio, variation in direction, S353
Wave length, (*see also* Frequency)
dominant computation, RP334
effective, of pyrometer color screens, S260
electromagnetic waves, measurement, S235
light as standard of length, S535, RP89
units of, M117
Wavelengths, spectra, (*see* spectrum or the substance)
standard solar, RP11
Wavemeter, radio, standardization, S489
with improved type of resonance indicator, S502
Waves, alternating-current, analysis, S119, S203
electrical, at transition point, S114
electromagnetic, direction of propagation, S353
irrotational translation, and solitary, in canals, mathematical theory, RP1272
standing electrical, on wires, S491
translation, effect of turbulence and channel slope on, RP1544
Waxed tissue paper, R125
Wear, effect on magnetic properties and tensile strength of steel wire, S510
of bearings (bronze), RP205
of brake lining, machine for testing, RP1297
of brake linings, tests, RP1427
of carpets, RP315, RP640, RP1505
of chromium plated gages, RP276
of leaded bronzes, RP551
of sole leather, T138, T147, T166, T215, RP834
of steels, RP214, RP348
of steels with oxide film, RP708
of stone flooring, RP612
of tire treads as influenced by reclaimed rubber, T294
of tire treads, measurement, RP1574
test of concrete, RP1252
test of paper, RP1390
Wearing quality, experimental currency-type paper, RP1701
sole leather, RP1626
of pima and ordinary cotton, T277
tests of traffic paints, RP1007

- Weather, effect on radio transmission, S476
instruments, automatic remote indicating, RP-1318
observations in upper atmosphere by radio sonde, RP1329
resistance of cast stone, RP389
resistance of clay products, RP88
resistance of porcelain enameled iron, RP1476
tests, accelerated, RP1
- Weather-exposure tests on metals used in aircraft, RP1316
- Weathering, asphalt shingles, RP1002
limestone, T349
roofing felts, RP888
roofing materials, BMS6, BMS29
slate, RP477
stucco-faced, gunite-faced, and "Knap-Concrete-Unit" walls, BMS94
test for asphalts and other materials, RP886
tests of painted steel or galvanized steel panels, BMS44
tests on asphalts, RP1073
tinned and soldered copper, RP422
- Weave, effect on properties of cloth, RP600
- Web plates, T327
- Webbing, elastic, overall, CS58
parachute, dynamic tests, RP1710
- Weighing and measuring devices, commercial, specifications, tolerances, and regulations, M85 (also called H14), H22, H29
by substitution, T208
equipment, testing of, H37
scale with stabilized-platform, T106
- Weight, atomic, bromine, S193
atomic, chlorine, S81
hydrogen, S77
- Weighted silk, method of cleaning, T322
- Weights, S17, C3, C61, M64
calibration of sets, S527, C3
commodities for shipment, C77
per bushel of various commodities, C10, C425
per gallon and cubic foot, C457
testing of, H37
- Weights and measures administration, H11, H26
in Congress, M122
equivalents, M1, C47, M121
history, S17, M64, M122
household commodities, C55, M39, M45
index to reports, first to twenty-first National Conference, M103
first to thirty-first National Conference, M172
laws of the United States, M20, H11, H26
metric system, C47, M2, M3, M21, M135
National Conference Reports, (*See* National Conference on Weights and Measures)
officials, manual, M1, H1, H11, H26
references, M103, M172
units, S17, C47, M64, M121
- Weinstein's formula for mutual inductance, S41
- Welded chain, R100
shelf-angle connections, strength, RP230
steel pedestals, RP232
steel tubing, tests, RP161
subway column bases, RP218
tanks, stresses, T243
- Welding aluminum, magnesium, and their alloys, C346
blowpipes, oxyacetylene, T200
bronze, T84
electric-arc, of steel, T179
internal stresses resulting from, T84
quality of steel, tests, RP1444
torch hose connections, H28 (1944)
- Welsbach mantle, selective radiation, S156
- Western hemlock plywood, CS122
- Weston Paper and Manufacturing Company's "Red Stripe" lath, structural properties of wood-frame constructions, BMS36
standard cell, (*see* Standard cells)
- Wetting and drying, effect on permeability of masonry walls, BMS55
- Wheatstone bridge, measurement of low resistance, S481
resistance thermometry, S241, S288
- Wheelbarrows, R105
- Wheeling Corrugating Company's "Wheeling Long-Span Steel Floor", structural properties, BMS15
- Wheels, buffing, full disk, R115
dental brush, R116
dental lathe grinding, R130
grinding, R45
motor-truck, tests, T150
railroad car, foreign specifications, T61
railroad car, thermal stresses, T209, T235
- White lead, basic carbonate, specification, C84
lead, basic sulphate, specification, C85
light filters, M114
light from the mercury arc and its complementary, S128
light, physical standard, S417
light standard, N.P.L., RP374
metals, determination of tin in, RP1610
paint, specifications, C89, BMS105
walls in a photometric laboratory, S20
- White-metal bearing alloys, RP512
- White-ware bodies, flints in, T310
moisture expansion, RP288, RP472
effect of flint and feldspar particle size, RP594
substitution of domestic for imported clays, RP1011
talcose ceramic, properties, RP1371
- Whiting, ceramic, specification, C152
- Wick test for efflorescence of building brick, RP1015
- Wien's displacement law, S180
- Wilson chamber, simplified automatic, RP437
- Wind forces on airship, T270
- Wind pressure on model of Empire State Building, RP545
on building, M179
on model of mill building, RP301
on structures, S523, RP301
on tall buildings, S523, RP637
on wires, circular cylinders, and chimneys, RP221
relation to air infiltration through windows, BMS45
- Wind-tunnel measurements on vehicle models, RP748, RP749
- Windage resistance of steam-turbine wheels, S208
- Window envelopes, T343
glass, specification, C164
glasses, infrared and ultraviolet transmission, RP113
shades, cloth, R199
- Windows, air infiltration through, BMS45
solid section steel, R72
- Windshields of aircraft, plastics for, RP1031
- Winter damage, laundry, RP294
- Wiping cheesecloth, specification, C255
cloths, specification, C267
rags, cotton, specifications, C261, C264
- Wire, barbed, and fencing, woven-wire (galvanized), R9
bridge-cable, stress corrosion, RP1604
cloth, Fourdrinier, CS36
cloth, insect screen, R122
cloth, insect screen, exposure tests, RP803
copper, tables, C81
diameters for mineral aggregate production screens, R147
electric, terminology, C37
fencing, R9
gages, C67
hoisting rope, testing by magnetic analysis, T315
mineral aggregate production screens, diameters, R147
nails, copper, R150
rope, elevator, maintenance, C441
rope, properties, T121
rope, sizes, R198
rope, specification, C208
rope tests on sheaves, T229
rope, worn, strength and inspection, RP920
steel, effect of stress on magnetic properties, S496
steel, effect of wear on magnetic properties and tensile strength, S510
steel, fatigue properties, RP754
- Wire-bound boxes, rotary-cut lumber stock for, R59
- Wire-wound cylinder, elastic problem, RP344
- Wiring rules, electrical, H3, H7, H33
- Wisconsin Units Company's "Pfeifer Units" walls, structural properties, BMS39
- Women's slip sizes (woven fabrics), CS121

Wood columns, fire tests, T184
 construction, dwellings, BMS107
 effect of pH on strength, RP1748
 fibers, as papermaking material, RP107, RP372
 method of sale, M45
 partitions, fire tests, RP1076
 screws, holding power, T319
 screws, specification, C140
 shingles, CS31
 struts, strength, T152

Wood-frame floors, structural properties, BMS25, BMS36, BMS37, BMS47
 partitions, structural properties, BMS25, BMS31, BMS36, BMS37, BMS42, BMS47
 roofs, structural properties, BMS25, BMS36
 wall construction, prefabricated, "Precision Built, Jr." structural properties, BMS89
 walls, structural properties, BMS25, BMS30, BMS31, BMS36, BMS37, BMS42, BMS47, BMS72

Wood-plank floors, partitions, and walls, structural properties, BMS37

Wood-using industries, standards and specifications, M79

Wooden butter tubs, R135

Wool, acid combination with, RP1510, RP1511, RP1523

acid dyeing, RP1510

acid-dyeing process, RP1012

affinity of anions of strong acids for, RP1452, RP1453

alkali reaction with, RP1516

alkaline degradation, RP1203

amino-nitrogen and arginine contents, RP787

blankets, properties, RP1528, RP1529, RP1589

bunting, specification, C355

combination with acid and base, RP1286, RP1343

combination with acids and with acid dye, RP1377

combination with positive and negative ions, RP543

combination with weak acids, RP1523

determination, RP821

effect of alkalis, RP810

effect of light, RP904

effect of solutions of sulfuric acid, RP980

elasticity, RP1486

electron microscopy of, RP1561

electrophoresis and isoelectric point, RP1245

enzymatic digestion, RP1500

fabrics, laundering, T273

fiber, structure, RP1412, RP1561, RP1579

fibers, grading, RP300

hydrolysis, catalyzed, RP1503

iodine number, RP689

isoelectric point, RP451

microscopy, electron, RP1561

mineral, for heated industrial equipment, CS117

mineral, for low-temperature installations, CS105

modified, properties, RP1506

oxidation, RP875, RP876, RP904, RP928, RP998, RP1089

photochemical decomposition of cystine in, RP1255

photochemical reactions, RP1091

polymeric structure, RP1500

protein, alkali degradation, RP885

protein, combination with acids in mixtures, RP1510, RP1511

reaction with alkali, RP1516

resistance to enzymes, RP1433

role of cystine in, RP1405, RP1433

scale substance, RP1579

stress-strain properties, RP1043

sulfur and sulphate in, RP731

titration curves, RP1452, RP1453, RP1510, RP1511, RP1523

ultraviolet transmission, RP6

waste, colored, specification, C260

Wool and part-wool blankets, CS39
 fabrics, CS65

Wool, and wool and cotton blankets for hospitals, CS136

Wool-cotton textiles, analysis, RP635

Wool — sulfuric-acid — water system, RP673

Wools, clean and raw, weights, T57

Workability of clay, (see also Plasticity), T234

Woven fabrics, size measurements for men's and boys' shorts, CS137

wire netting, commercial standard, CS133

wire fencing, R9

Wrapping materials, water-vapor permeability, M127

paper, waterproofed, T312

Wraps, apple, CS44

Wrenches, open-end and box, R220

Wrought brass, microstructure, T82

iron, comparative properties of hand puddled vs. mechanically puddled, RP124

iron, microstructure, T97

iron, phosphorus in, T97

iron, structure and mechanical properties, T252

Wrought-iron pipe nipples, CS6 (later combined with CS5)

valves, and fittings, R57

X

Xanthate solutions for fluidity measurements, RP1441

Xanthophyll and carotin, absorption spectra, RP337

Xenocyanine, infrared arc spectra photographed with, RP473

Xenon, spectra, S345, S414, RP115, RP245, RP275, RP351, RP521, RP710, RP781, RP898, RP1164, RP1264

Zeeman effects, RP1264

X-ray absorption in concrete, RP1735

diffraction applied to metal structure, RP1210

diffraction at elevated temperatures, RP1782

diffraction patterns of hydrated calcium aluminates, RP1539

diffraction patterns of mica, RP1675

diffraction patterns of rubber, RP1039, RP1170, RP1218

dosage, RP56, RP169

dosage measurements, (see X-ray ionization chambers)

examination, nitrided iron and steel, RP126

generators, high-voltage, RP475

ionization chambers, RP56, RP119, RP211, RP271, RP397, RP417, RP424, RP865, RP1111

ionization of carbon disulphide, RP927, RP733

measurement of thickness of cold-worked surface layer resulting from metallographic polishing, RP1494

measurements, RP491, RP505, RP592

method for study of the constitution of portland cement, RP233

patterns of hydrated calcium silicates, RP1560

protection, RP1155, C374, H15, H20

protection, thickness of lead, concrete, and steel required, RP1806

protective glass, properties, RP870

studies of lead compounds, RP1251, RP1392

study of tricalcium aluminate, RP1437

tubes, high-voltage, RP595

tubes, thick-walled, RP527

X-rays, absorption by copper, RP212, RP666

absorption, standard curves, RP666

bactericidal effect, RP736

characteristic, soft, S425

continuous spectrum, RP60

effect of wave form, RP592

efficiency of production, RP235

high-voltage, measurement, RP1111

m-Xylene heat of combustion, RP1629

o-Xylene, heat of combustion, RP1629

p-Xylene, heat of combustion, RP1629

Xylenes from petroleum, RP501

Xylose, distillation to yield furfural, RP1132

electrolytic oxidation, RP773

from cellulosic wastes, RP152

oxidation by bromine water, RP82

purification and mutarotation, RP723

Y

Yard, definition, S535

Yarn, lath, R92

mail-bag duck, T278

Yarns, cotton, effect of twist, RP27
 cotton, physical testing, T19
 effect of number and twist on properties of cloth, RP861, RP862
 effect of sizing on properties, RP993
 mercerized cotton, regain, CS11
 multiple strand test, RP61
 rayon, effect of twist on properties, RP361
 rope, bending test, T300
 silk, effect of humidity on strength and elongation, RP1353
 textile, effects of drying conditions, RP1337
 Yaw, effect on vane anemometers, RP1056
 Yearbook, Standards:
 1927, M77
 1928, M83
 1929, M91
 1930, M106
 1931, M119
 1932, M133
 1933, M139
 Yeast, action on starch hydrolysis products, RP-1599
 Yellow tints, factors which determine saturation, T92
 Young's modulus, elasticity, RP1742
 temperature coefficient, RP531
 Ytterbium, spectra, RP1053
 spectrophotometric determination, RP1456
 Yttrium monoxide, band spectrum, RP273
 spectra, S421, RP12, RP55

Z

Zeeman effect, columbium, RP1656
 hafnium (Hf II), RP732
 lanthanum, RP468, RP497
 theoretical, RP23
 tungsten, RP1125
 uranium, RP1729
 vanadium, RP906
 xenon, RP1264
 yttrium, RP12

Zinc, and its alloys, physical and mechanical properties, C395
 bronze, standard test specimens, T59
 coatings, corrosion-protective value, RP867
 coatings, effect on the endurance properties of steel, RP454
 coatings, iron and steel, C80
 coatings, measurement of thickness, RP1240
 coatings, Preece test, RP688
 coatings, specifications and tests, C275
 corrosion in soils, RP1602
 critical potentials, S403
 cyanide plating solutions, T195
 determination in dental gold alloys, S532
 determination in steels and irons, RP664
 pure, physical properties, S522
 reflecting power, S379
 spectrographic determination in tin, RP1451
 spectrum, S411
 sulphide, phosphorescent, spectral energy distribution, S538
 uranyl acetates, properties, RP672
 Zinc-coated steel and iron, corrosion tests, RP10
 Zinc oxide, determinations of cobalt and manganese, RP380
 lead, specification, C88
 melting point, RP136
 specification, C87
 system ZnO-SiO₂, RP136
 Zirconia, effect of some oxide additions on thermal changes of, RP1662
 systems and porcelains, RP1703
 Zirconium, spectra, S548, RP202, RP255, RP296
 steel plates, T207
 Zones, standard time, M111, M155
 Zoning enabling act, standard State, M54, BH5
 ordinances, preparation, BH16
 primer, BH3

